

PANASONIC®**Service Manual****Supplementary****ONE-HALF INCH VIDEO TAPE RECORDER
MODEL NV-8100AD****SPECIFICATIONS**

System:	Rotary 2-head system, single scan.	Video Input:	Microphone 20 K Ω , 60 db, unbalanced
Tape Speed:	12 ips.	AUX.	1 M Ω , 0 db, unbalanced
Tape Used:	1/2 inch Video Tape, A type winding	Audio Frequency Range:	80~10,000 Hz
Tape Length:	2,400 ft., 1,200 ft., 600 ft.	Video S/N:	Better than 40 db
Recording Time:	40 minutes with 7.5" (2,400 ft.) Tape (Standard)	Operation:	5 Solenoids (STOP, REW, FF, PLAY, STANDBY)
Recording System:	USA TV Standard, 60 fields, 525 lines	Source Voltage:	117 V, AC
Video Modulation System:	Double Side-band FM	Source Frequency:	60 Hz
Video Input:	1.0 V p-p 75 Ω , unbalanced	Power Consumption:	165 W
Video Output:	1.0 V p-p 75 Ω , unbalanced	Dimensions:	16-1/2" (L) $\times$ 16-1/2" (W) $\times$ 10" (D)
Resolution:	Approximately 260 lines (monoscope)	Weight:	Approximately 110 lbs
Video S/N:	Better than 40 db		

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INTRODUCTION

PANASONIC Video Tape Recorders model NV-8100A and NV-8100AD feature full automatic function of each mode and automatic gain control both in video and audio levels. NV-8100AD features in addition the electronic editing function which steps up the model of NV-8100A.

The horizontal resolution of PANASONIC video tape recorder has been improved from the original of 220 lines to 260 lines.

The video circuit, therefore, the audio and record/playback circuits are different from those of NV-8100 of which the horizontal resolution is 220 lines. The video and audio circuits also carry the AGC circuit. Power circuit and control circuit stays unchanged. The editing circuit is compatible with that of NV-8100D. Following is the brief explanation of the circuits for PANASONIC one-half inch VTR.

NV-8100: 220 lines conception:

Please refer to the original service manual of NV-8100 (VRD-101).

260 lines conception:

The video, audio and R/PB circuits has been altered for the higher resolutions, therefore, refer to this manual for these circuits. Please note NV-8100 are not facilitated with the AGC circuit.

NV-8100D: Refer to the original service manual with the supplementary of NV-8100D (VRD-102) for 220 lines conception. When the unit is 260 lines refer to this manual for the said circuit without AGC portion.

**NV-8100A
&
NV-8100AD:** All of these models are of 260 lines conception with AGC circuit which can be traced into this manual. These models are solenoid operated with the feather touch buttons. The NV-8100AD model is equipped with the editing facility which is to be traced into the NV-8100D supplementary manual.

NOTE: HIGHER RESOLUTION MODELS ARE DESIGNATED BY THE SERIAL NUMBER PREFIXED WITH THE ALPHABET "N".

The video and audio circuits are explained in this manual with the data of the improved resolution of 260 lines, including the automatic gain control circuit and R/PB amplifier. In addition, the solenoid mechanism is described in the following pages.

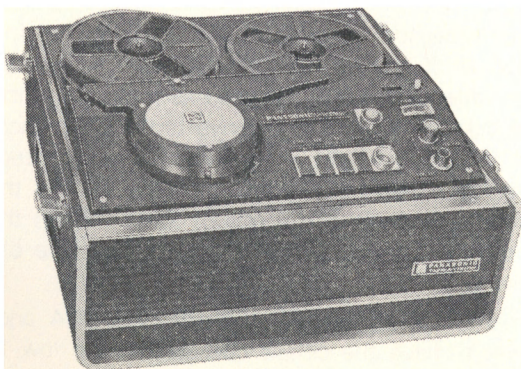
The editing circuit is eliminated as this is explained in the supplementary manual of NV-8100D.

The record/playback amplifier is slightly changed for the higher resolution. Please compare the attached schematic with that of NV-8100.

The mechanical parts list is provided with the cross reference for easier index clarifying the exclusive parts for specific models.

The electric parts cover the higher resolution models of PANASONIC video tape recorder.

The schematic diagram is the black box system in which each circuit is classified with the title and separately attached with the specific diagram.



NV-8100AD



NV-8100A

VIDEO CIRCUIT DESCRIPTION

- VIDEO INPUT:** The pin No. 4 of the 8 pin connector J302 receives the video signal from the TV receiver. The receptacle J301 is for the video input signal from the TV camera.
- INPUT SELECTOR:** S301
Optionally selects the video input signal either from the TV receiver or the TV camera for VTR video amplifier circuit.
- LOW-PASS FILTER:** Eliminates 4.5 MHz audio intermediate frequency when recording from the TV receiver.
Also filters some dispensable high frequency of video signals from a TV camera for the optimum picture quality.
- AUTO LEVEL-MAN SELECTOR:** S302
Controls video input level automatically when set at AUTO LEVEL, and manually when positioned at MAN.
- VIDEO LEVEL CONTROL:** R303
Adjustable manually when S302 is set at MAN side. Needs to be controlled for the optimum level of modulation.
- AGC CIRCUIT:** Q301 Q304 & D301 D303
Refer to Fig. 1
Stabilizes automatically the video output level to the reasonable extent irrelevant to the input level of video signal. With non-linearity of the diode D301 placed at the emitter side of the transistor Q301, the feedback voltage is controlled automatically as obvious from the circuit diagram (Fig. 1).

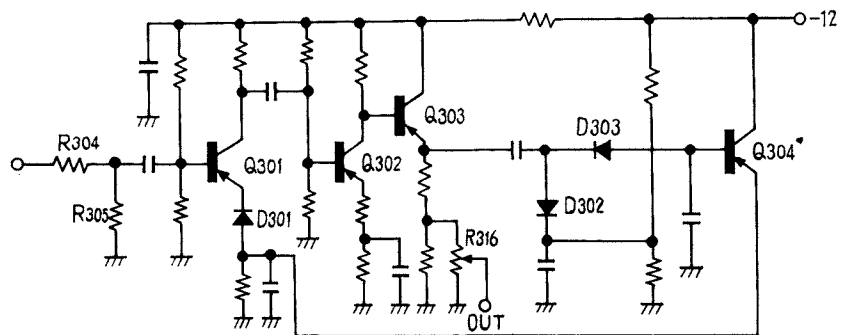


Fig. 1

When the input level is increased, inevitably the input signal for Q301 increases with the output level of Q301 and Q303, inducing the rise in the output level of the peak voltage detector, and causes the output increase in the negative voltage of the emitter of Q304 converted in impedance. The negative bias current for D301 might accordingly be augmented to increase its resistance and the feedback voltage of Q301 offsets the input amplitude for the desired balance of Q303 output level. When the input level is decreased on the contrary, the counter result may take place for stabilizing the output level.

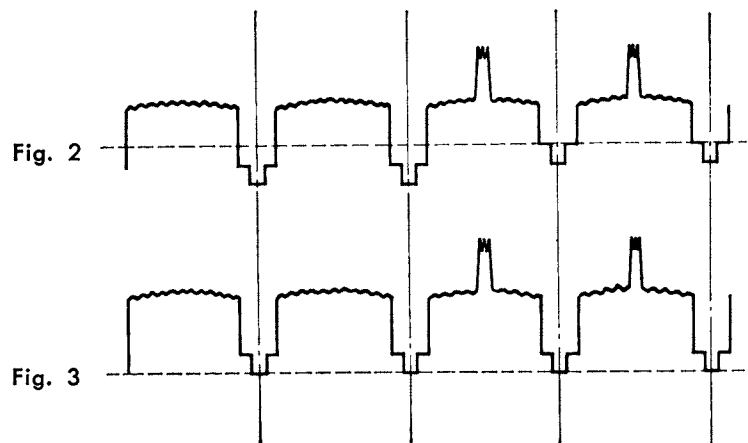
For optimizing the linearity of the diode, the resistors R304 and R305 attenuate the input level to have the circuit operated in the low level of voltage.

VIDEO AMPLIFIER & PREEMPHASIS:
Q305 Q306

Composed of a pair of amplifier to amplify the input voltage for driving the modulator. By adopting the negative feedback circuit of C318 and R324, frequency response is much improved. The coil L304 clips off the negative feedback voltage in the higher portion of the frequency resulting in uprating the over-all gain of the pre-emphasis circuit.

CLAMP CIRCUIT:
D304

Video signal is the composite wave format of sync signal and video signal which is congenial with direct current. The average level of the video signal changes according to the specific level of the composite signal. When the signal is driven into the modulator without reforming the waveform, some unfavorable ups and downs are noticed in the modulator on each portion of sync tip, pedestal and white peak configurations (Refer to Fig. 2). Frequency modulation stays stabilized by connecting the clamp leveler C319 and D304 (Fig. 3).



WHITE CLIP CIRCUIT:
D305

The driven video signal in this portion has been pre-emphasised specially in high frequency which tends to over-modulate in the front and final porch of the waveform. The picture appears to be solarized in the playback mode. This circuit plays a roll to clip the rising white level of the frequency at a certain voltage. The diode D305 negatively-biased by R335 is put on only when the signal is driven beyond the rated level and clips the over-modulated white signal.

MODULATION DRIVER:
Q307

Composed of Emitter Follower circuit which receives the high impedance signal driven by the diodes in the Clamp and White Clip circuit, and which has the modulation circuit driven in the low impedance through the direct current connections.

FM MODULATOR:
Q308, Q309

FM modulator is built up with the free running multi-vibrator in which the frequency is controlled by the base voltage regulated with the signal voltage. The combination of R343 and C324 forms a waveform balancer to obtain well-balanced symmetry in the modulated frequency waveform. The frequency is output through a symmetry transformer and driven into the recording amplifier. Amplitude of frequency modulation should be adjusted for the range between the sync tip and white peak signals.

E-E SYSTEM:

The circuit in which some portion of FM signals are distributed into the limiter circuit for reproducing the signals on the monitor TV receiver in the record mode (E-E stands for Electronics-to-Electronics).

**RECORD AMPLIFIER:
Q501**

Record amplifier drives the video head by feeding recording current into the heads for recording on the magnetic tape. The relationship between the input and output of the video heads exhibits the curve as shown in Fig. 4 and 5.

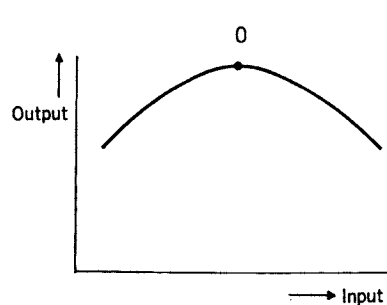


Fig. 4

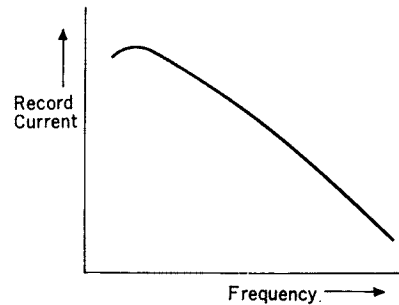


Fig. 5

The optimum recording current for the maximum playback output needs to be at 0 point in the figure 4, which may vary according to the tape-to-head speed, head gap length or the material bonded on the tape, etc., and the recording current tends to decrease as the frequency shows a rise.

The recording current should be determined at the amplifier side of T501 with the voltage waveform reformation at TP501 (the arms of R511).

**P.B AMPLIFIER:
Q502~504**

The amplifier circuit should be designed in the most effective way to pick up the informations recorded on tape. During playback mode, each of the two video heads detects the taped signal feeding the separate RF signal to the mixing transformer T501.

The equalizer control is provided to permit equalization and obtain proper signal frequency response. With this control, compensation is made for any loss incurred during the record and playback processes. Adjustment is made for the flattest response consistent with best signal-to noise ratio.

**LIMITER:
Q310~315**

The video FM signals are routed to the six-stage limiter before they are demodulated because they include various noises caused by level fluctuations due to inconstant head-to-tape contact, unwanted signals or an incorrectly reproduced side-band. The limiter serves to reduce undesirable level fluctuations.

The circuit works as an amplifier when the signal voltage appeared at the collector of the transistor stays within the rated voltage of positive direction of the diode.

At the instance the voltage at the collector overwhelms the rated voltage of the diode, the diode is shortened to feed the negative signal to the base with remarkable gain decrease and results in amplitude clipping of the waveform. The potentiometer R354 is equipped for producing symmetrical square waves in the circuit.

**FM DEMODULATOR:
D308, 309, Q317**

The FM Demodulator is pulse defferential utilizing the spure wave signal fed out of the limiter output (See Fig. 6 on Page 5).

(1) The waveform shows the output signal from the limiter circuit, which is differentiated by T302 transistor to form the negative and positive pulse wave (2) of stable amplitude.

Rectifying the wave signals into the dense pulses as shown in (3), the signal is demodulated into the waveform as shown in (4) by tracing average level of each pulse via low pass filter (differential circuit).

The symmetric waveform must be obtained to minimize the carrier leakage, which might be reduced by the sharpened range of the low-pass-filter.

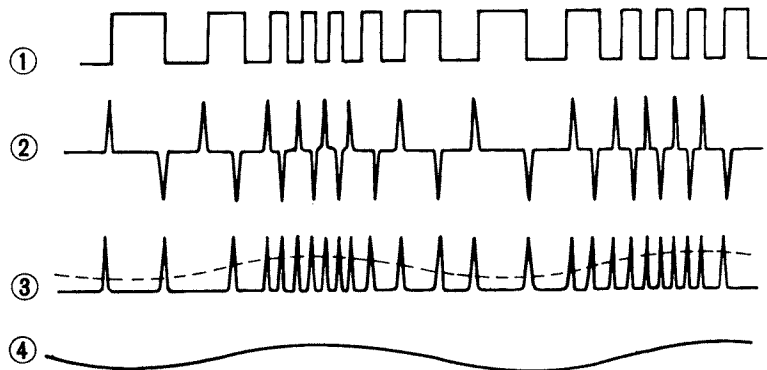


Fig. 6

LOW-PASS FILTER: The filter circuit is so designed as to eliminate the carrier leakage by narrowing the frequency range, which may detriment the horizontal resolution if the range is determined too narrow.

VIDEO AMPLIFIER: Q318 Demodulated signal is stepped up by the amplifier for the needed level. The output level is adjusted by the resistor R372. The output of the mixing circuit is de-emphasized by the Q318 Emitter R376 and L311 components.

VIDEO OUTPUT AMPLIFIER: Q319 The amplifier is designed to supply the video signal to the external monitor TV usually connected with a 75Ω coaxial cable. Therefore, the output impedance has to be lower and the outlevel may need 1 Vp-p minimum for optimum performance. The coupling capacitor (C348) is resulted in the large capacity of $1000\mu\text{F}$.

VIDEO LEVEL INDICATOR: Q320 The stable level of modulation is needed to maintain optimum playback performance. The video level indicator circuit is necessitated for the above reasons. The level is indicated in the electronics to electronics (E-E) picture in the record mode so that the operator can view the level. The optimum level is determined by the picture that shows maximum output level before the picture appears to be overmodulated.

This system has major advantages over the meter indication system in giving high sensitivity with the lowest distortion.

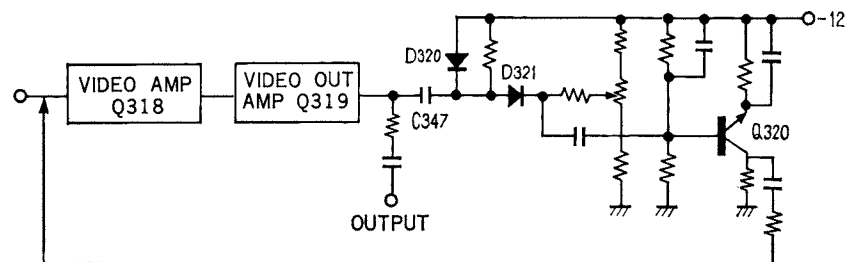


Fig. 7

The emitter of the video amplifier showing the negative sync pulse, needs to be clamped at -12 volts with C347 and D320 as below (Also refer to Fig. 7).

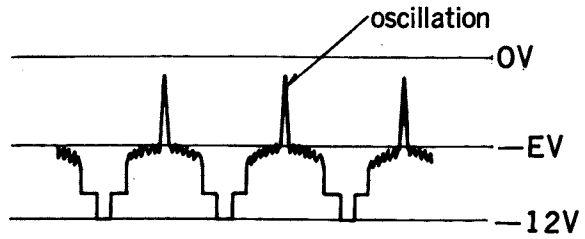


Fig. 8

The signal above is fed to D321 diode gate of which the direct current $-E$ volt is fed to the other end resulting in reverse bias of the diode permitting no signal transpassed when the tip voltage level is rated within the value $-EV$. At the instance the tip level exceeds $-EV$, the diode D321 is shortened to allow the exceeding voltage passed the diode, amplified in reverse amplitude and routed back to the base of Q318 positively giving the oscillation to the output waveform to show the overmodulation in the E-E picture.

MEMO

VIDEO CIRCUIT ADJUSTMENT

LIMITER BALANCE:
R354

DEMODULATOR BALANCE:
R365

1. Connect the SG to TP-501 through a 100 ohm resistor as Fig. 9.

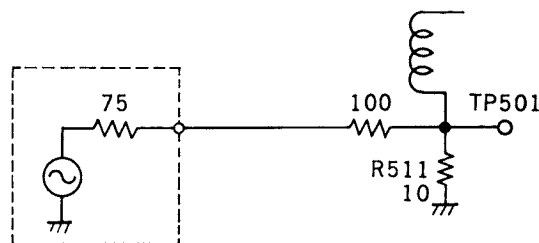


Fig. 9

2. Connect the oscilloscope to TP307.
3. Adjust the SG output frequency for 2.5 MHz and also adjust the output level for approximately 3 mVp-p at R511 resistor.
4. Turn on the VTR. (Do not push the REC button)
5. Turn the Video Level Control R372 and set it around the central position.
6. While observing the oscilloscope waveform adjust the R354 (LIMITER BALANCE) and R365 (DEMOD. BALANCE) alternately to minimise the 2.5 MHz signal of which the waveform is described in Fig. 10-b below.

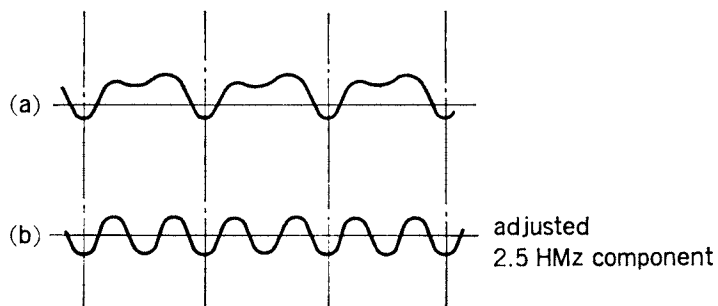


Fig. 10

CAUTION: The SG output level of the secondary RF should be less than -40 dB.

MODULATOR CARRIER FREQUENCY:
R331

1. Connect the frequency counter at TP304.
2. Turn the capacitor C324 and set it at the center position as described in Fig. 11.
3. Place the deck in the E-E mode, and set the Video Level Control at its minimum position.
4. Preset the resistor R335 (White Clip) at the extreme CW position.
5. Adjust the resistor R331 for 2.6 MHz oscillation. (Freq. Adjuster)

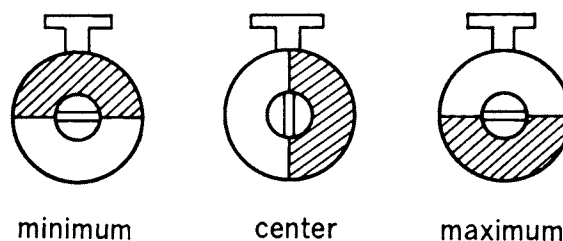


Fig. 11

**MODULATOR BALANCE:
R343 and C324**

1. Connect the oscilloscope at TP307.
2. Place the Deck in the REC mode.
3. While observing the waveform on the oscilloscope, output waveform of 2.6 MHz signal should be adjusted for the minimum by turning the R343 and C324.
4. When C324 is turned, follow the instructions made in the MODULATOR CARRIER FREQUENCY as the oscillation frequency changes.

**DEVIATION:
R303**

1. Connect the calibrated SG at TP305.
2. Connect the stairstep wave at the camera input terminal of the deck.
3. Connect the oscilloscope to TP307.
4. Set the frequency oscillation of the SG at 4.5 MHz with the output level of approx. 10 mVp-p.
5. Place the deck in E-E mode and adjust R303 for zero beat of white level at the top step of the stairstep waveform as described in Fig. 12 when the deviation reaches at the 4.5 MHz modulation of the frequency. This condition is principally called "STANDARD MODULATION LEVEL".

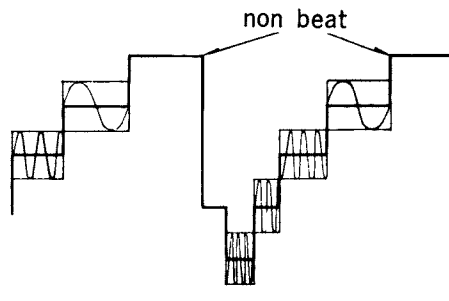


Fig. 12

**VIDEO OUTPUT LEVEL:
R372**

1. Connect the minitor TV receiver to the terminal J302.
2. While observing the TP307 with the oscilloscope, the output level of the stairstep waveform modulated by the standard modulation level should be adjusted for 1 Vp-p.

**INDICATOR LEVEL:
R384**

1. Connect the TV receiver to the J302 and place the deck in the E-E mode.
2. Confirm the standard modulation level and 1 Vp-p output level of stairstep waveform at TP307.
3. Adjust R348 (Indicator level) for the level with which the E-E picture proves to be the maximum modulation.

WHITE CLIP LEVEL:

1. Feed the Test Pattern signal from the camera input terminal.
2. Connect the oscilloscope at TP303.
3. When the Test Pattern signal is modulated in the standard modulation level, adjust R335 (white clip) for the level just before which the preemphasis signal of high frequency portion is clipped.

**AUTO LEVEL:
R316**

1. Connect the staircase wave signal to the camera input terminal of the deck.
2. Connect the oscilloscope to TP307.
3. Place the deck in E-E mode and the output level modulated by the standard modulation level should be confirmed for 1 Vp-p.
4. Set the Video Level Control to AUTO-LEVEL by turning the control clockwise until the click is heard.
5. Set R316 for 1 Vp-p by turning it so slowly and gently as the DC current is flown permitting a little time to stabilise the level.

1. Connect the staircase wave signal to the camera input terminal of the deck.
2. Connect the oscilloscope to TP307.
3. Place the deck in E-E mode and the output level modulated by the standard modulation level should be confirmed for 1 Vp-p.
4. Set the Video Level Control to AUTO-LEVEL by turning the control clockwise until the click is heard.
5. Set R316 for 1 Vp-p by turning it so slowly and gently as the DC current is flown permitting a little time to stabilise the level.

RECORD CURRENT:

R503

1. Connect the oscilloscope at TP501 and place the deck in the E-E mode.
2. Set the Video Control level to its minimum position (no modulation).
3. Adjust R503 for 140 mVp-p by observing the oscilloscope waveform.
4. Confirm the total head current of both video heads reaches 14 mA p-p at 2.6 MHz.

1. Connect the oscilloscope at TP501 and place the deck in the E-E mode.
2. Set the Video Control level to its minimum position (no modulation).
3. Adjust R503 for 140 mVp-p by observing the oscilloscope waveform.
4. Confirm the total head current of both video heads reaches 14 mA_{p-p} at 2.6 MHz.

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AUDIO CIRCUIT DESCRIPTIONS

TV-CAMERA INPUT SELECTOR: S301-2

The selector placed at TV side accesses the audio input signal from the monitor TV receiver into VTR. When placed at CAMERA side actuates MIC input (J401) or AUX input (J402) connector for recording.

MAN-AGC SELECTOR: S302-4~302-6

The switch S302-4 shortens the AGC control transistor Q401 when set for manual level operation.

The switch S302-5 drives the output signal into the selected circuit (AGC or manual mode) for level meter reading.

The switch S302-6 actuates the audio level control R403 when set at MAN side.

RECORD-PLAYBACK

SELECTOR RELAY: S401-1~S401-4

The selector S401-1~S401-4 equipped with two contacts for four circuits is activated by direct current -24 volts, which is stepped down from -28 volts supplied for Q407~Q408 transistors in Erase Oscillator circuit.

AUDIO AMPLIFIER: Q402~Q405

Transistors Q402 through Q405 amplify input audio signal for Q403 transistor of which the collector feeds back the negative pulse of frequency response to the emitter of Q402 transistor. This characterizes the following response to the given frequency especially in the playback mode (See Fig. 13).

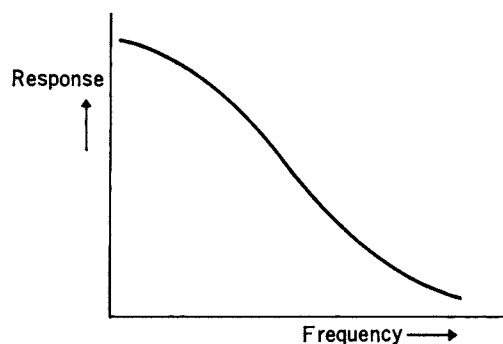


Fig. 13

AUDIO LEVEL METER

AND AGC CIRCUIT: Q406~401, D401~402

Q406 modulates impedance to utilize the signal for the level meter amplifier and AGC circuit; the output signal of Q406 is converted into direct current by the diodes D401 and D402 for driving signal of M401 meter and AGC circuit. The negative DC signal is fed to the base of Q401 transistor via S302-5 selector for controlling the collector impedance of Q401 to automatically adjust the input level.

PLAYBACK GAIN CONTROL: R423

The resistor R423 to adjust the playback gain control.

BIAS TRAP CIRCUIT: L401, C415, L402, C423

Bias signal leakage in AC bias recording method is eliminated by the series resonant trap circuit composed of L401 C415 and L402 C423 components.

BIAS AND ERASE OSCILLATOR: Q407, Q408

The push-pull circuit consisting of Q407 and Q408 oscillates 70 KHz frequency for AC bias recording and erasing.

AUDIO CIRCUIT ADJUSTMENT

VU METER ADJUSTMENT:

1. Connect the standard signal generator to the Microphone input (J401) or AUDIO AUX input (J402) and set SSG for 1 KHz.
2. Connect a VTVM to TP401, and turn the power switch on, and depress the REC button while setting the video control for manual operation.
3. Adjust the output gain control of the SSG with input volume control of the unit (R403) set at maximum to obtain output voltage of 2 Vrms at TP401.
4. With the above setting, adjust R437 to obtain 0 VU reading on the VU meter.

ADJUSTMENT OF THE WAVEFORMS FOR BIAS AND ERASURE OSCILLATOR:

1. Set the recorder in the record mode.
2. Connect an oscilloscope to TP402 and set the audio level R403 at the minimum position.
Confirm that the output waveform on the oscilloscope appears as sine wave symmetry without much distortion as shown in the Fig. 14.

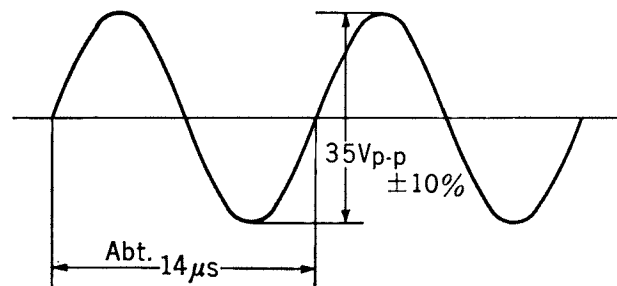


Fig. 14

ADJUSTMENT OF TRAP CIRCUIT FOR BIAS SIGNAL:

1. Depress the REC button and set the R403 at the minimum position.
2. The frequency of about 70 KHz, leaking from the oscillator for recording and erasing bias, is to appear on the oscilloscope if it is connected to TP401.
3. Adjust the variable inductance L401 and L402 in the attenuating trap circuit for 70 KHz and obtain minimum waveform of output level on the oscilloscope.

ADJUSTMENT OF AUDIO RECORDING BIAS CURRENT:

1. Insert a 100Ω resistor between the H2 terminal on the printed circuit board and the audio record head, and connect a high-sensitivity VTVM capable of reading 1 mV across the resistor as shown in Fig. 15.

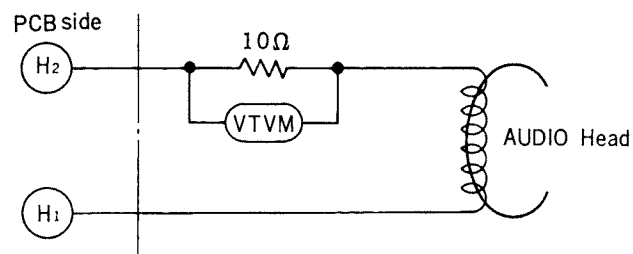


Fig. 15

2. Depress the Rec button and set R403 at minimum position.
3. Adjust the Bias adjustment control R440 for 2.5 to 3.6 mV rms reading on the VTVM.

ADJUSTMENT OF AUDIO PLAYBACK GAIN CONTROL:

1. Connect standard Signal Generator to the MIC input (J401) and set SSG for 1 KHz.
2. With the audio level control set at maximum, adjust the output level control of the SSG for 0-VU on VU meter.
3. Record and playback the tape. Adjust the playback Gain Control Adjustment (R423) control for output voltage of 2 Vrms.

AGC CIRCUIT ADJUSTMENT:

1. Place the recorder in REC mode and settle selector S302 to AGC position.
2. Connect SSG to MIC connector J401 and drive the pulse signals as shown in Fig. 16-1 and 16-2 respectively.
3. Connect the oscilloscope to TP401 and confirm the waveform respectively as shown in Fig. 16-3 and 16-4 with the input signal mentimed above.

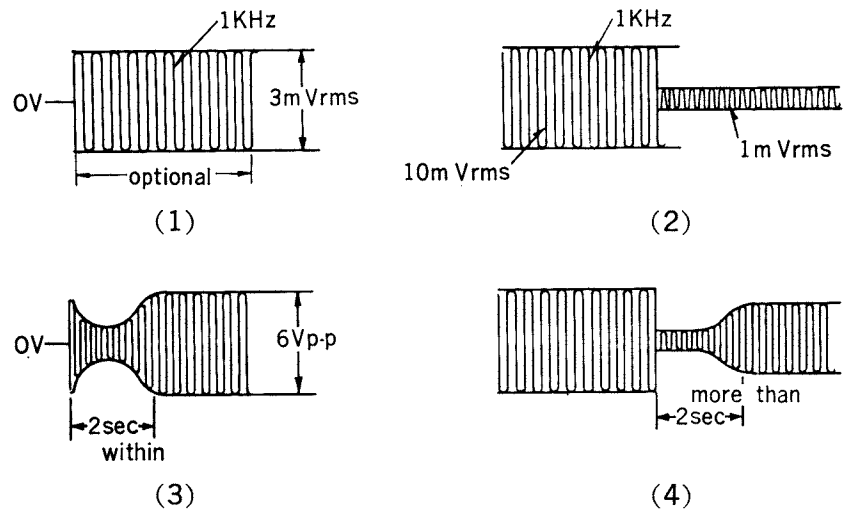


Fig. 16

BLOCK DIAGRAM OF AGC VIDEO CIRCUIT

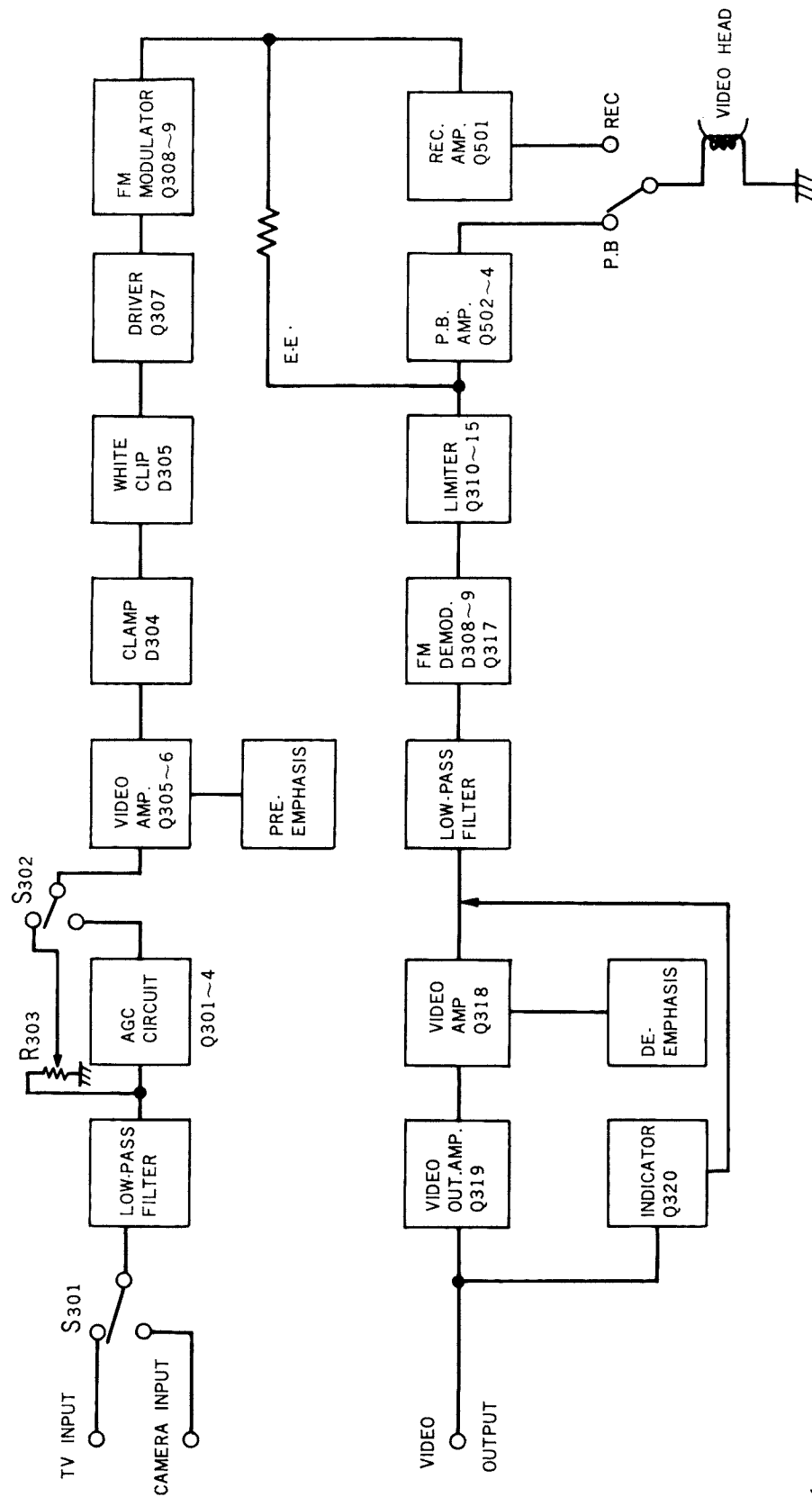


Fig. 17

MECHANICAL ADJUSTMENT

GENERAL INFORMATION ON SOLENOID

The shafts of the plunger arm and the plunger lever (shaft-A and shaft-B) must be in parallel to obtain smooth solenoid operation.

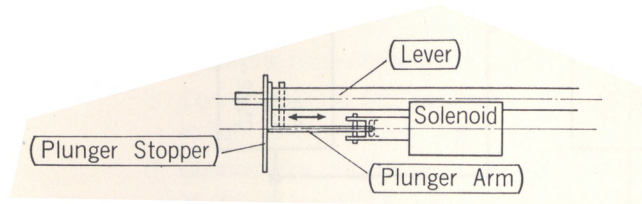
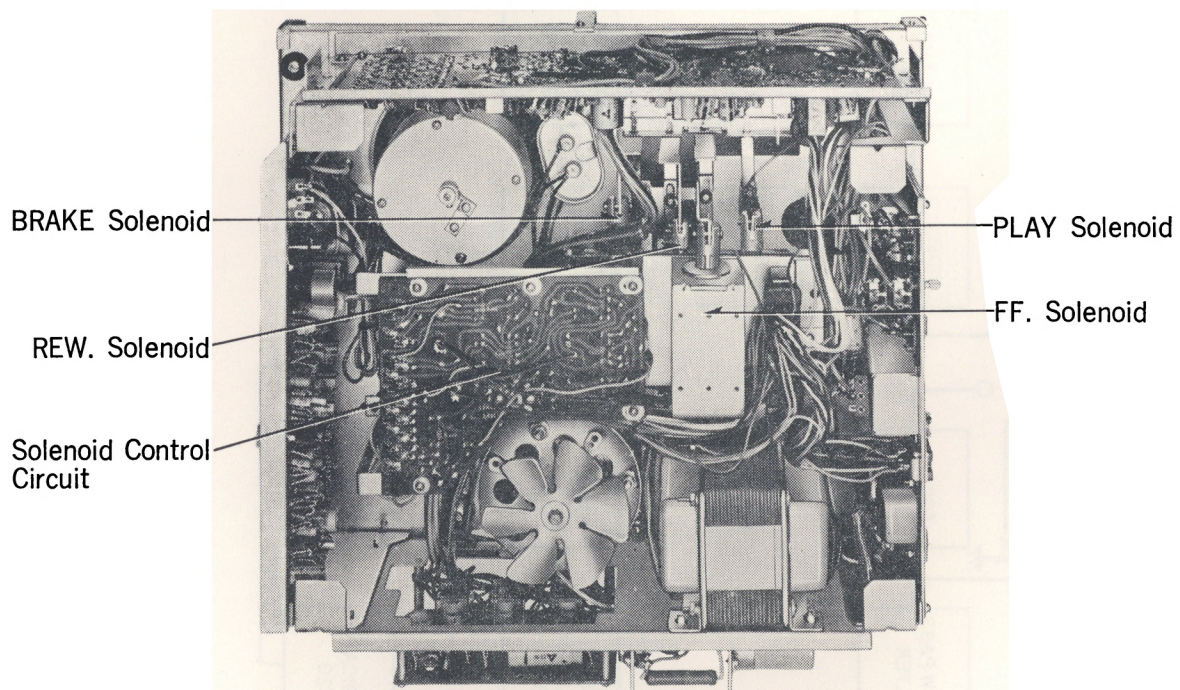
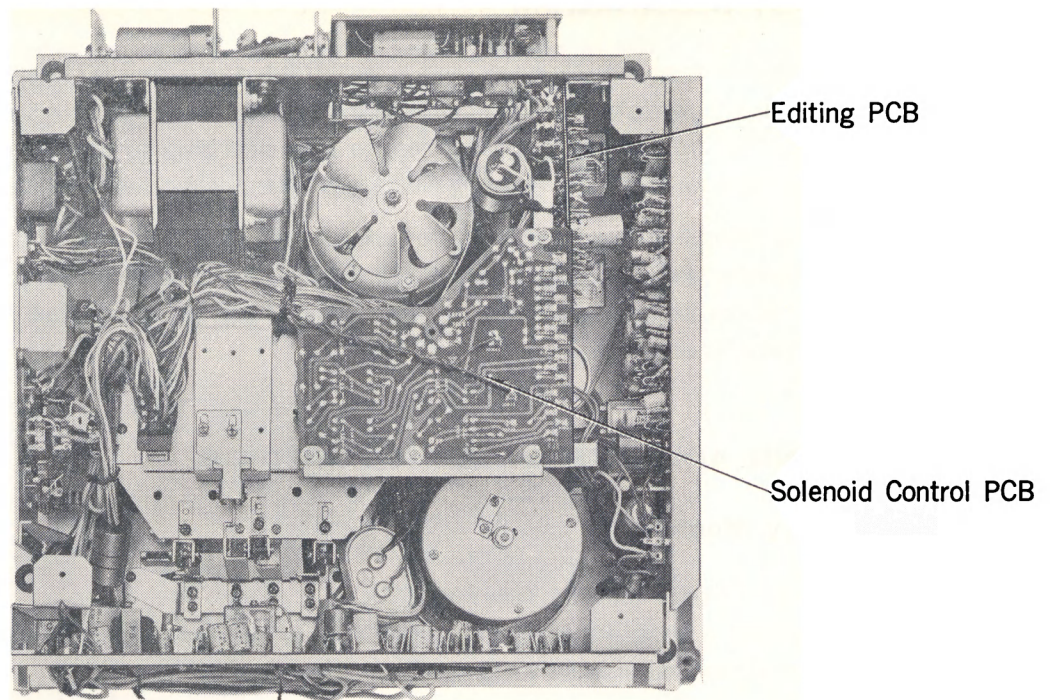


Fig. 18



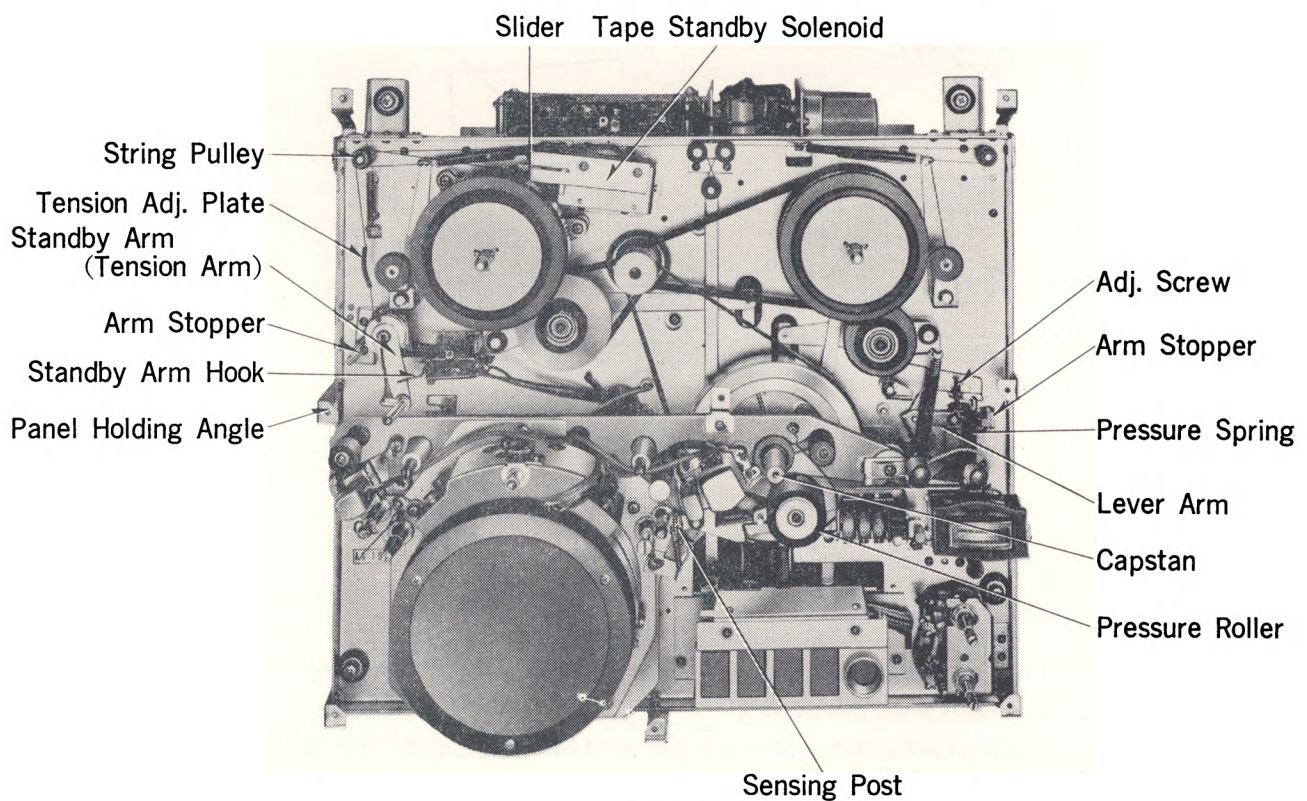
**REW., FF., PLAY, BRAKE Solenoids
For NV-8100A**

Fig. 19



NV-8100AD

Fig. 20



NV-8100A

Fig. 21

TAPE STANDBY MECHANISM

1. Braking force is applied to both reel hubs as soon as the STOP button is pressed to stop the tape motion. However, after a few seconds the brakes are released to loosen the tape tension arm and the tape contact on the head drum. This removes the tape from the rotating video head to avoid head clogging and unnecessary tape wear. It permits a standby position with fast start for recording particularly when the recorder is activated by a remote switch.
2. The automatic switching from braking solenoid to tape standby solenoid is made by utilizing the charging characteristics of a capacitor and a combined relay circuit. While the capacitor is being charged, the braking relay is activated. This applies the brakes to both reel hubs. When charging is completed, the brake is released and the tape standby solenoid is actuated.

MOUNTING AND ADJUSTMENT OF SOLENOIDS

1. Tape Standby Mechanism

Adjustment of Tape Standby Solenoid: (See Fig. 22)

With the tape standby solenoid activated, adjust the stroke of the solenoid and string tension so that the tension arm is moved in the direction of arrow in Fig. 22.

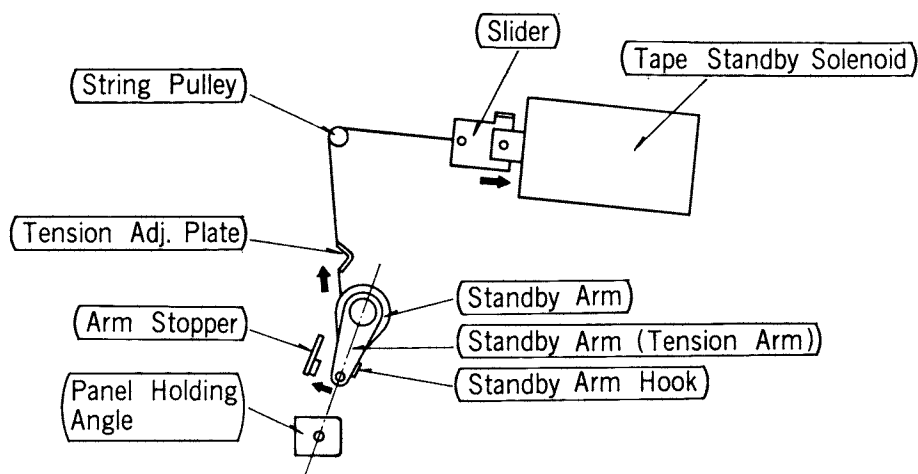


Fig. 22

While the tension arm can be moved independently when the tape standby arm is not moved, the tape standby arm also moves the tension arm when it is moved.

With the tape standby solenoid activated, adjust the gap between the standby arm and arm stopper for approximately 1 mm/0.03937 inch by bending the tension adjustment plate.

And also confirm that the tension arm switch is off when the tape standby solenoid is not activated.

2. Play Solenoid

- (A) With the plunger rod depressed entirely into the coil, adjust the gap as shown in Fig. 23 below to approx. 0.03937 inch (1 mm) by turning screw (1) and fix it with the nut (2). Also confirm that the angle θ is less than 180° . If the angle θ is over 180° bend the arm stopper in the direction of arrow and push out the lever arm.

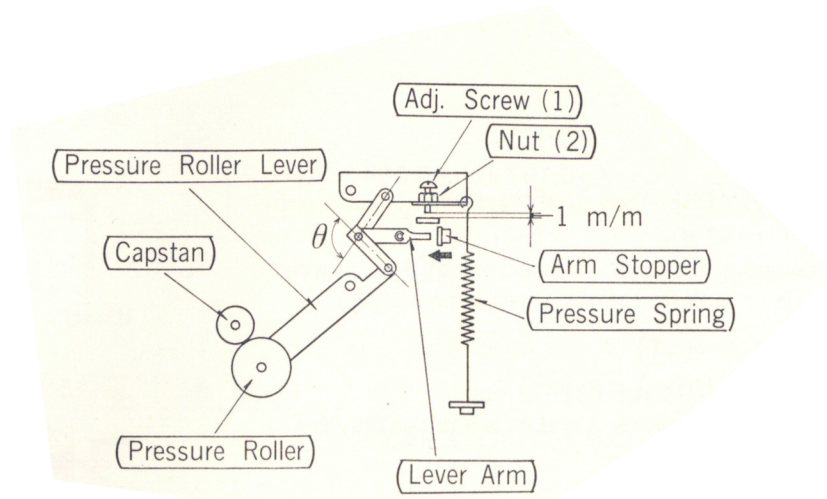


Fig. 23

- (B) When the contact pressure of capstan against the pressure roller is insufficient due to the lack of hold-back tension of the solenoid, use a washer as shown in Fig. 24.

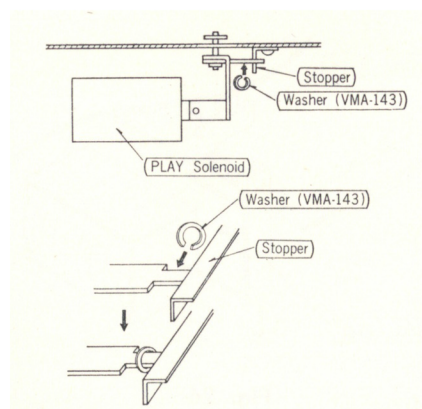


Fig. 24

3. Rewind and FF. Solenoids

- (A) With the plunger rod depressed entirely into the coil, adjust the gap as shown in Fig. 25 below to approx. 0.03937 inch (1 mm).

Stroke of solenoid plunger..... S ($=0.197 \text{ inch} \pm 0.004 \text{ inch}$
 $=5 \text{ mm} \pm 1 \text{ mm}$)

Change of spring (FF. or REW)
length whether solenoid activated or not..... 1 mm
(FF. or REW Rod slides 1 mm at point "A".)

REMARKS: $d = 1.22 \text{ inch} \pm 0.04 \text{ inch}$ ($31 \pm 1 \text{ mm}$)
These measurements (S , a and d) are noted only for reference.

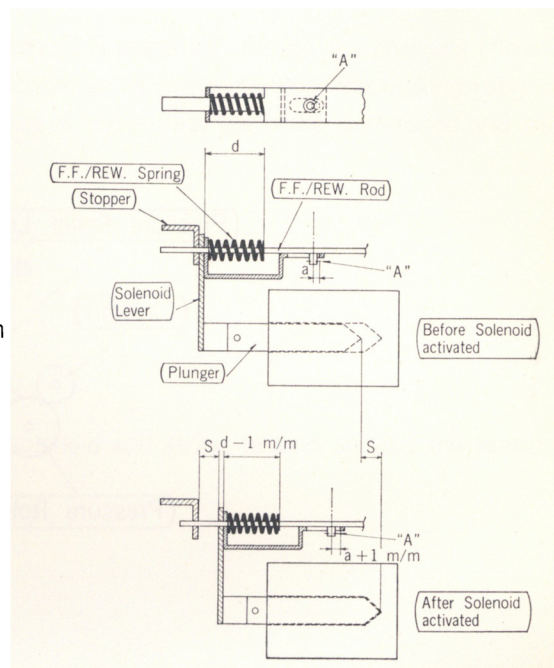


Fig. 25

- (B) If the winding torque (either in FF. or Rewind) is insufficient, bend the solenoid lever in the direction of arrow as shown in Fig. 26.

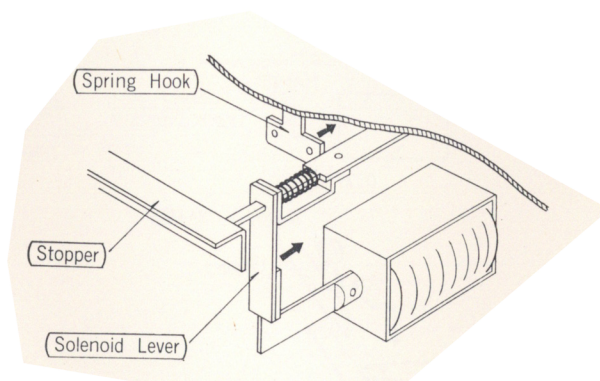


Fig. 26

- (C) If the hold-back tension of the solenoid is still insufficient, bend the spring hook as shown in Fig. 26 in the direction of arrow. When further increase of tension is required, use a washer as shown in Fig. 24.

ADJUSTMENT OF PRESSURE PAD ARM

When running the tape with the pressure roller and capstan disengaged (FF. or Rewind mode), the sensing post must be in parallel with the tape and be slightly projected in the direction of arrow (about 0.03937 inch or 1 mm deeper than the regular PLAY mode) to make close contact with the tape. (See Fig. 27.)

The amount of sensing post projection can be adjusted by bending the tip of the pressure pad arm in either direction.

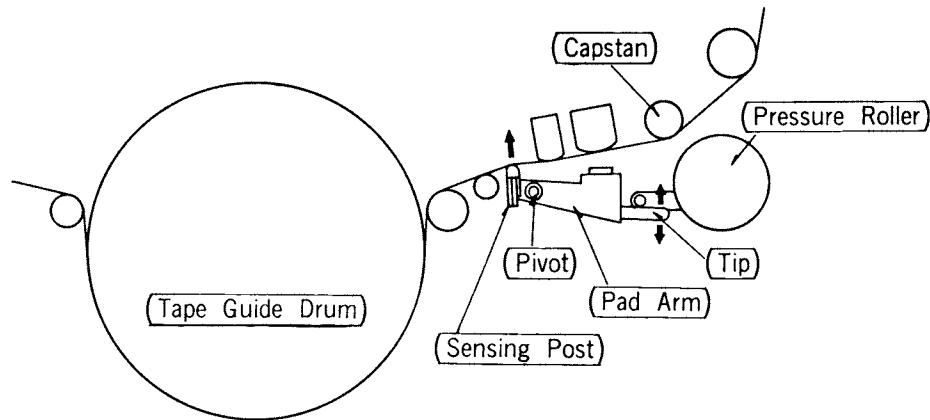


Fig. 27

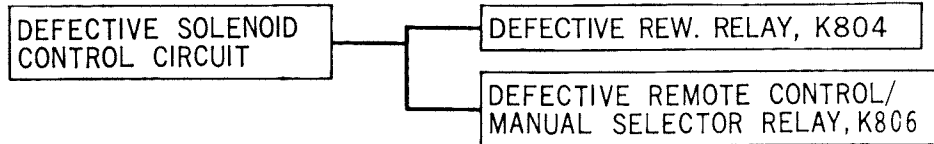
50 CPS SOURCE

When using the recorder where 50 Hz A-C power is standard, use the following procedures.

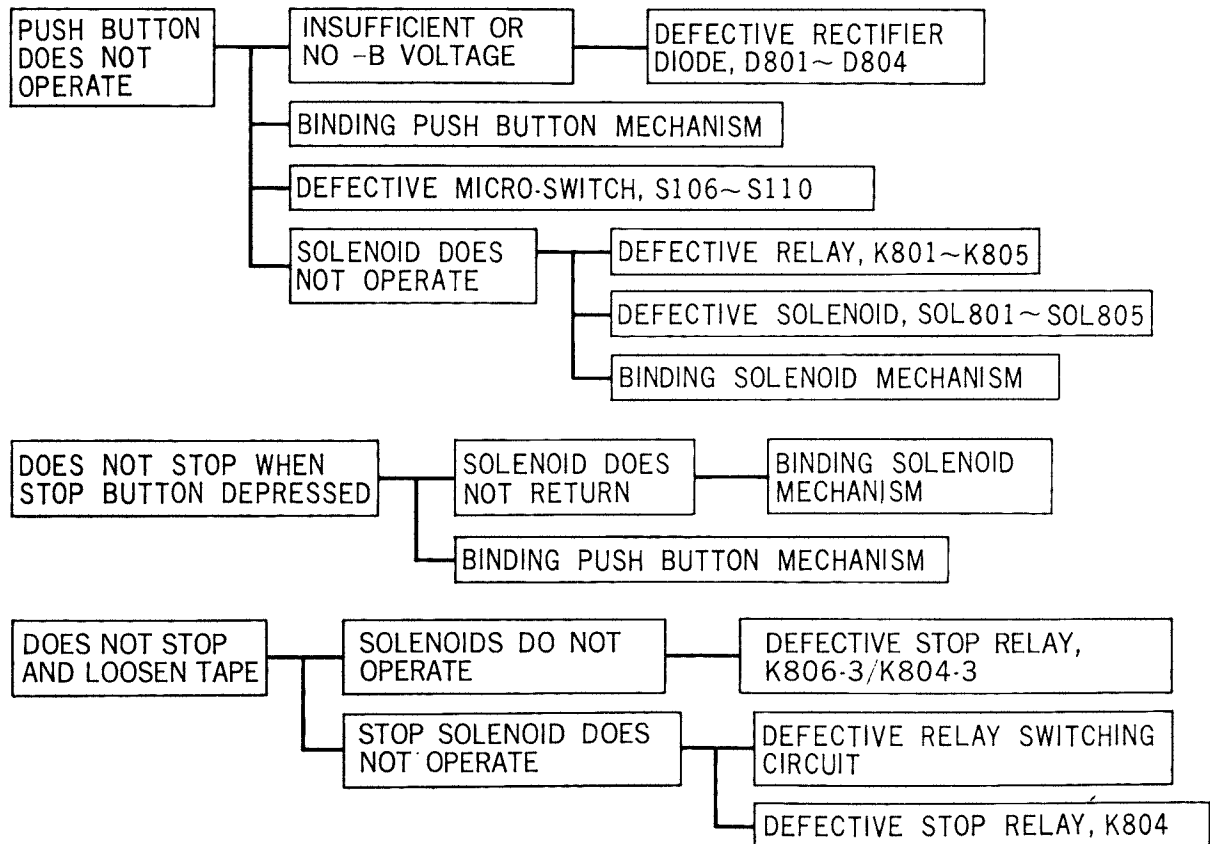
1. Place the 50 Hz adaptor sleeve on the capstan.
2. Leave approx. 0.03937 inch (1 mm) gap between Adj. Screw Tip and the end of Arm Stopper by turning the Adjustment Screw (See Fig. 21 for the location).

TROUBLE SHOOTING GUIDE

Defective Recording Circuit



Defective Solenoid Control Circuit



EXCLUSIVE PARTS FOR NV-8100A & AD

Part No.	Part Name & Description	Per Set (Pce.)	Compatibility	
			A	AD
VYD1	Packing Unit	1	0	0
VPG3043	Outer Carton	1	0	0
VPN3053	Inner Carton	1	0	0
VYK17	Enclosure	1	0	0
VYP17	Top Panel Assembly	1	×	0
VYP16-1	Top Panel Assembly	1	0	×
VGK73	Cover, Editing Button	1	×	0
VMS56-1	Nut, Edit/Rec Button Cover	1	×	0
VGN83	Edit Plate	1	×	0
VGB12	Badge, Auto-Level	1	0	0
VES6-2	Operation Button Assembly	1	0	0
VGU14	Push Button	4	0	0
VMG23	Rubber Spacer	4	0	0
VMZ1-1	Insulation Spacer	4	0	0
VGK60-1	Cover, Record Button	1	0	0
VJS16	Socket, 9P Connector	1	0	0
VSM3	Micro Switch	5	0	0
QJS101-1	Lamp Socket	1	0	0
VES12	AGC Switch Assembly	1	0	0
VMA202	Angle, AGC Switch Mounting	1	0	0
ESL185-1	Lever Switch	1	0	0
VJR1L1PSR	Terminal, AGC Switch	1	0	0
VXA26	Tension Arm Assembly	1	0	0
VXA24-1	Tension Arm Unit	1	0	0
VMA117-1	String Adjuster	1	0	0
VES8-1	Editing Switch Assembly	1	×	0
ERD14TK563	Carbon Film Resistor, 1/4 W, 56 K Ω	1	0	0
VMA219-2	Bracket, Editing Switch Assembly	1	0	0
VEG19	Video Head Assembly, w/R-PB Amp.	1	0	0
VEH15	Video Head Bar Assembly	1	0	0
VXK17	Tape Supporter Assembly	1	0	0

Part No.	Part Name & Description	Per Set (Pce.)	Compatibility A AD	
VXM4	Taper Post-A, Grounded	1	0	0
VXM5	Taper Post-B, Grounded	1	0	0
VXM2-2	Pad Arm Assembly	1	0	0
VXA25-3	Sensing Post Assembly	1	0	0
VMB19	Spring Pad Arm	1	0	0
VXL26	Solenoid Assembly, Tape Standby	1	0	0
VSJ5006	Solenoid, SDC9C, SOL805, Standby	1	0	0
VMA133	Mounting Plate, SDC9C Solenoid	1	0	0
VMA129-1	Stopper, Solenoid Pin	1	0	0
VMA153	Slider	1	0	0
VMS50	Solenoid Pin	5	0	0
VXL24	Solenoid Unit	1	0	0
VJP2-2	Plate, 7P Internal Connector	1	0	0
VSJ2	Solenoid, SDC9R, SOL803, Rewind	1	0	0
VSJ1	Solenoid, SDC12CM, SOL801, 802, 804 (Play, FF, Brake)	3	0	0
VEP801K-1	PCB Assembly, Solenoid Control	1	0	0
VSJ14	Socket, 20P, Internal Connection	1	0	0
VJS6-2	Socket, 7P, Internal Connection	1	0	0
VSJ204	Miniature Relay	6	0	0
2SC696	Transistor	1	0	0
DS1P	Diode	5	0	0
SD1C	Diode	2	0	0
ERD14VK332	Carbon Film Resistor, 1/4 W, 3.3 K Ω	1	0	0
ERD14VK333	Carbon Film Resistor, 1/4 W 33 K Ω	1	0	0
ERD1TK101	Carbon Film Resistor, 1 W, 100 Ω	1	0	0
ERD12TK750	Carbon Film Resistor, 1/2 W, 75 Ω	1	0	0
ERM4P150	Wire Wound Resistor, 4 W, 15 Ω	1	0	0
ECEA50V10	Electrolytic Capacitor, 50V, 10 μ F -10% $+100\%$	1	0	0
ECEA50N47	Electrolytic Capacitor, 50V, 47 μ F	1	0	0
VEJ10-1	Jack Panel Assembly	1	0	0
VJS12	Receptacle, 20P, Remote Control	1	0	0
VJP18	Plug, 20P, Internal Connection	1	0	0
VJP20	Plug, 9P, Internal Connection	1	0	0

Part No.	Part Name & Description				Per Set (Pce.)	Ref. No.
	VIDEO CIRCUIT					
2SA550	Transistor				3	Q315, 318, 319
2SC183	Transistor				11	Q306, 307, 310, 311, 312, 313, 314, 315, 316, 317, 320
2SC269	Transistor				2	Q308, 309
SD16	Diode				10	D306, 307, 308, 309, 310, 311, 312, 313, 314, 315
OA70	Diode				2	D304, 320
IS953	Diode				6	D305, 321, 316, 317, 318, 319
VCR1	Compound Parts				6	CR301, 302, 303 304, 305, 306
EVR12TK221	Carbon Film Resistor	1/2 W	220 Ω	$\pm 10\%$	1	R379
ERD14TF331	Carbon Film Resistor	1/4 W	330 Ω	$\pm 1\%$	2	R338, 344
ERD14TF222	Carbon Film Resistor	1/4 W	2.2 K Ω	$\pm 1\%$	2	R339, 342
ERD14VK330	Carbon Film Resistor	1/4 W	33 Ω	$\pm 10\%$	4	R380, 328, 359, 363
ERD14VK101	Carbon Film Resistor	1/4 W	100 Ω	$\pm 10\%$	5	R369, 376, 323, 345, 349
ERD14VK151	Carbon Film Resistor	1/4 W	150 Ω	$\pm 10\%$	5	R350, 351, 352, 356, 357
ERD14VK221	Carbon Film Resistor	1/4 W	220 Ω	$\pm 10\%$	4	R301, 302, 346, 391
ERD14VK331	Carbon Film Resistor	1/4 W	33 Ω	$\pm 10\%$	5	R348, 364, 330, 336, 361
ERD14VK102	Carbon Film Resistor	1/4 W	1 K Ω	$\pm 10\%$	5	R362, 366, 370, 375, 388
ERD14VK152	Carbon Film Resistor	1/4 W	1.5 K Ω	$\pm 10\%$	6	R358, 389, 390, 322, 329, 332
ERD14VK222	Carbon Film Resistor	1/4 W	2.2 K Ω	$\pm 10\%$	4	R337, 347, 377, 383
ERD14VK332	Carbon Film Resistor	1/4 W	3.3 K Ω	$\pm 10\%$	2	R324, 334
ERD14VK472	Carbon Film Resistor	1/4 W	4.7 K Ω	$\pm 10\%$	4	R378, 321, 325, 327
ERD14VK562	Carbon Film Resistor	1/4 W	5.6 K Ω	$\pm 10\%$	5	R360, 367, 371, 382, 386
ERD14VK682	Carbon Film Resistor	1/4 W	6.8 K Ω	$\pm 10\%$	2	R340, 341
ERD14VK103	Carbon Film Resistor	1/4 W	10 K Ω	$\pm 10\%$	4	R333, 387, 368, 373
ERD14VK393	Carbon Film Resistor	1/4 W	39 K Ω	$\pm 10\%$	1	R385
ERD14VK563	Carbon Film Resistor	1/4 W	56 K Ω	$\pm 10\%$	2	R320, 326
EVT30AA00B12	Variable Resistor	0.1 W	100 Ω -B		1	R365
EVTS3AA00B52	Variable Resistor	0.1 W	500 Ω -B		4	R354, 331, 335, 343
EVTS3AA00B13	Variable Resistor	0.1 W	1 K Ω -B		1	R372
EVTS3AA00B14	Variable Resistor	0.1 W	10 K Ω -B		1	R348

Part No.	Part Name & Description	Per Set (Pce.)	Ref. No.
EVR29HL35B32	Variable Resistor 300Ω-B	1	R303
ECEA16N3R3	Electrolytic Capacitor non-polar 16V 3.3μF -10% +100%	1	C319
ECEA6N220	Electrolytic Capacitor non-polar 6.3V 220μF -10% +100%	1	C307
ECEA6V47N	Electrolytic Capacitor 6.3V 47μF -10% +100%	1	C315
ECEA6V220N	Electrolytic Capacitor 6.3V 220μF -10% +100%	4	C317, 339, 345, 346
ECEA16V3R3N	Electrolytic Capacitor 16V 3.3μF -10% +150%	1	C318
ECEA16V10N	Electrolytic Capacitor 16V 10μF -10% +100%	4	C316, 320, 323, 327
ECEA16V33N	Electrolytic Capacitor 16V 33μF -10% +100%	4	C329, 333, 337, 338
ECEA16V100N	Electrolytic Capacitor 16V 100μF -10% +100%	1	C344
ECEA16V1000	Electrolytic Capacitor 16V 1000μF -10% +100%	3	C328, 330, 348
ECEA25V1	Electrolytic Capacitor 25V 1μF -10% +150%	4	C332, 334, 335, 352
ECQM05103KZ	Polyester Capacitor 50V 0.01μF ±10%	2	C349, 350
ECQM05473KZ	Polyester Capacitor 50V 0.047μF ±10%	3	C322, 336, 347
ECQS05121JZ	Styrol Capacitor 50V 120 PF ±5%	3	C301, 305, 321
ECQS05151JZ	Styrol Capacitor 50V 150 PF ±5%	2	C341, 342
ECQS05221JZ	Styrol Capacitor 50V 220 PF ±5%	2	C351, 355
ECQS05561JZ	Styrol Capacitor 50V 566 PF ±5%	2	C302, 304
ECCD05400JC	Ceramic Capaeitor 50V 40 PF ±5%	1	C325
ECCD05500JC	Ceramic Capaeitor 50V 50 PF ±5%	1	C326
ECCD05820JC	Ceramic Capaeitor 50V 82 PF ±5%	2	C340, 343
VLQ5H5R0K	Peaking Coil 5μH ±10%	2	L301, 303
VLQ3H100K	Peaking Coil 10μH ±10%	1	L302
VLQ4H390K	Peaking Coil 39μH ±10%	1	L311
VLQ5H560K	Peaking Coil 56μH ±10%	1	L312
VLQ5H820K	Peaking Coil 82μH ±10%	3	L308, 309, 310
VLQ5H221K	Peaking Coil 220μH ±10%	2	305, 306
VLQ5H561K	Peaking Coil 560μH ±10%	1	L304
ELT10S905	High Frequency Transformer	1	T302
ELT10S906	High Frequency Transformer	1	T301
ECV1ZW20P12	Variable Capacitor	1	C324
VSS1-1	Slide-Switch, Input	2	S301-1, S301-2
VJS1001-1	Receptacle, Camera	1	J301
VJS1	Socket, 8P	1	J302

Part No.	Part Name & Description				Per Set (Pce.)	Ref. No.
	AUDIO CIRCUIT					
2SA550	Transistor				1	Q401
2SB175	Transistor				3	Q403, 404, 405
2SB348	Transistor				1	Q402
2SB324	Transistor				1	Q406
2SB178A	Transistor				2	Q407, 408
OA70	Diode				2	D401, 402
ERD14VK220	Carbon Film Resistor	1/4 W	22Ω	±10%	1	R442
ERD14VK750	Carbon Film Resistor	1/4 W	75Ω	±10%	2	R444, 445
ERD14VK181	Carbon Film Resistor	1/4 W	180Ω	±10%	1	R410
ERD14VK561	Carbon Film Resistor	1/4 W	560Ω	±10%	1	R436
ERD14VK601	Carbon Film Resistor	1/4 W	600Ω	±10%	1	R432
ERD14VK681	Carbon Film Resistor	1/4 W	680Ω	±10%	1	R429
ERD14VK102	Carbon Film Resistor	1/4 W	1 KΩ	±10%	3	R413, 425, 439
ERD14VK152	Carbon Film Resistor	1/4 W	1.5 KΩ	±10%	3	R422, 424, 438
ERD14VK182	Carbon Film Resistor	1/4 W	1.8 KΩ	±10%	2	R418, 404
ERD14VK222	Carbon Film Resistor	1/4 W	2.2 KΩ	±10%	1	R411
ERD14VK272	Carbon Film Resistor	1/4 W	2.7 KΩ	±10%	2	R416, 443
ERD14VK332	Carbon Film Resistor	1/4 W	3.3 KΩ	±10%	1	R421
ERD14VK472	Carbon Film Resistor	1/4 W	4.7 KΩ	±10%	3	R417, 420, 427
ERD14VK562	Carbon Film Resistor	1/4 W	5.6 KΩ	±10%	3	R407, 409, 431
ERD14VK103	Carbon Film Resistor	1/4 W	10 KΩ	±10%	4	R408, 433, 434, 435
ERD14VK123	Carbon Film Resistor	1/4 W	12 KΩ	±10%	1	R415
ERD14VK153	Carbon Film Resistor	1/4 W	15 KΩ	±10%	1	R426
ERD14VK273	Carbon Film Resistor	1/4 W	27 KΩ	±10%	1	R419
ERD14VK333	Carbon Film Resistor	1/4 W	33 KΩ	±10%	1	R412
ERD14VK393	Carbon Film Resistor	1/4 W	39 KΩ	±10%	1	R428
ERD14VK563	Carbon Film Resistor	1/4 W	56 KΩ	±10%	1	R430
ERD14VK184	Carbon Film Resistor	1/4 W	180 KΩ	±10%	1	R414
ERD14TK184	Carbon Film Resistor	1/4 W	180 KΩ	±10%	1	R401
ERD14VK105	Carbon Film Resistor	1/4 W	1 MΩ	±10%	1	R402
ERC12GK100	Solid Resistor	1/2 W	10Ω	±10%	1	R441

Part No.	Part Name & Description				Per Set (Pce.)	Ref. No.
ERD12TK101	Carbon Film Resistor	1/2 W	100Ω	±10%	1	R44
ERM4P101	Resin Film Resistor	4 W	100Ω	±10%	1	R446
EVLS3AA00B13	Variable Resistor	0.1 W	1 KΩ-B		1	R437
EVLS3AA00B23	Variable Resistor	0.1 W	2 KΩ-B		1	R423
EVLS3AA00B15	Variable Resistor	0.1 W	100 KΩ-B		1	R440
EVCB45U35A24	Variable Resistor		20 KΩ-A		1	R403
ECEA6V100N	Electrolytic Capacitor	6.3V	1000μF	- 10% +100%	1	C427
ECEA6V10N	Electrolytic Capacitor	6.3V	10μF	- 10% +100%	2	C406, 424
ECEA6V33N	Electrolytic Capacitor	6.3V	33μF	- 10% +100%	6	C407, 413, 420 425, 426, 401
ECEA16V33N	Electrolytic Capacitor	16V	33μF	- 10% +100%	1	C414
ECEA6V100N	Electrolytic Capacitor	6.3V	100μF	- 10% +100%	1	C417
ECEA16V3R3N	Electrolytic Capacitor	16V	3.3μF	- 10% +150%	3	C403, 412, 421
ECEA16V47	Electrolytic Capacitor	16V	47μF	- 10% +100%	3	C404, C418, 422
ECEA25V1	Electrolytic Capacitor	25V	1μF	- 10% +150%	1	C428
ECEA25V10	Electrolytic Capacitor	25V	10μF	- 10% +100%	1	C419
ECEA25V100	Electrolytic Capacitor	25V	100μF	- 10% +100%	1	C434
ECQM05682KZ	Polyester Capacitor	50V	0.0068μF	±10%	1	C431
ECQM05562KZ	Polyester Capacitor	50V	0.0062μF	±10%	2	C415, 423
ECQM05123KZ	Polyester Capacitor	50V	0.012μF	±10%	2	C432, 433
ECQM05183KZ	Polyester Capacitor	50V	0.018μF	±10%	1	C430
ECQM05223KZ	Polyester Capacitor	50V	0.022μF	±10%	4	C408, 410, 411, 416
ECCD05221K	Ceramic Capacitor	50V	220 PF	±10%	2	C405, 429
ECCD05331K	Ceramic Capacitor	50V	330 PF	±10%	1	C409
ELT10S904	Variable Inductance				2	L401, 402
VTA24A19A	Transformer				1	T401
ELT30KIA	Transformer, Oscillation				1	T402
VSY401	Relay, Miniature				1	K401
VSE2	Audio Level Meter				1	M401
WY619X	Audio Head				2	PU401-1 PU401-2
VBS1A	Erase Head, Full Track				1	PU402
WY733-1	Erase Head, Audio Dubbing				1	PU403
VJJ1	Jack, MIC Input				1	J401
VJJ2	Jack, Audio, Aux. & Line Out				2	J402, 403

Part No.	Part Name & Description				Per Set (Pce.)	Ref. No.
	R/PB AMPLIFIER					
2SC645	Transistor				2	Q502, 503
2SC456	Transistor				1	Q501
2SA550	Transistor				1	Q504
ERC12BK151	Solid Resistor	1/2 W	150Ω	±10%	1	R509
ERC12BK221	Solid Resistor	1/2 W	220Ω	±10%	2	R506, 507
ERC12BK561	Solid Resistor	1/2 W	560Ω	±10%	1	R510
ERD14VK100	Carbon Film Resistor	1/4 W	10Ω	±10%	1	R511
ERD14VK220	Carbon Film Resistor	1/4 W	22Ω	±10%	1	R508
ERD14VK330	Carbon Film Resistor	1/4 W	33Ω	±10%	1	R525
ERD14VK470	Carbon Film Resistor	1/4 W	47Ω	±10%	1	R502
ERD14VK151	Carbon Film Resistor	1/4 W	150Ω	±10%	1	R501
ERD14VK101	Carbon Film Resistor	1/4 W	100Ω	±10%	1	R527
ERD14VK331	Carbon Film Resistor	1/4 W	330Ω	±10%	1	R528
ERD14VK821	Carbon Film Resistor	1/4 W	820Ω	±10%	1	R524
ERD14VK102	Carbon Film Resistor	1/4 W	1 KΩ	±10%	3	R515, 520, 526
ERD14VK222	Carbon Film Resistor	1/4 W	2.2 KΩ	±10%	1	R521
ERD14VK272	Carbon Film Resistor	1/4 W	2.7 KΩ	±10%	1	R504
ERD14VK392	Carbon Film Resistor	1/4 W	3.9 KΩ	±10%	1	R505
ERD14VK562	Carbon Film Resistor	1/4 W	5.6 KΩ	±10%	2	R517, 518
ERD14VK153	Carbon Film Resistor	1/4 W	15 KΩ	±10%	1	R523
ERD14VK273	Carbon Film Resistor	1/4 W	27 KΩ	±10%	1	R513
ERD14VK333	Carbon Film Resistor	1/4 W	33 KΩ	±10%	1	R519
ERD14VK563	Carbon Film Resistor	1/4 W	56 KΩ	±10%	1	R522
ERD14VK154	Carbon Film Resistor	1/4 W	150 KΩ	±10%	1	R514
EVT30AA00B12	Variable Resistor		100ΩB.		1	R503
ECEA10V33	Electrolytic Capacitor	10V	33μF	-10% +100%	1	C504
ECE16V47	Electrolytic Capacitor	16V	47μF	-10% +100%	2	C509, 515
ECEA25V1	Electrolytic Capacitor	25V	1μF	-10% +150%	1	C506
ECE25V47	Electrolytic Capacitor	25V	47μF	-10% +150%	1	C502
ECSY25EF1	Solid Alminum Capacitor	25V	1μF	±10%	1	C503
ECQM05562KZ	Polyester Capacitor	50V	0.0056μF	±10%	1	C505

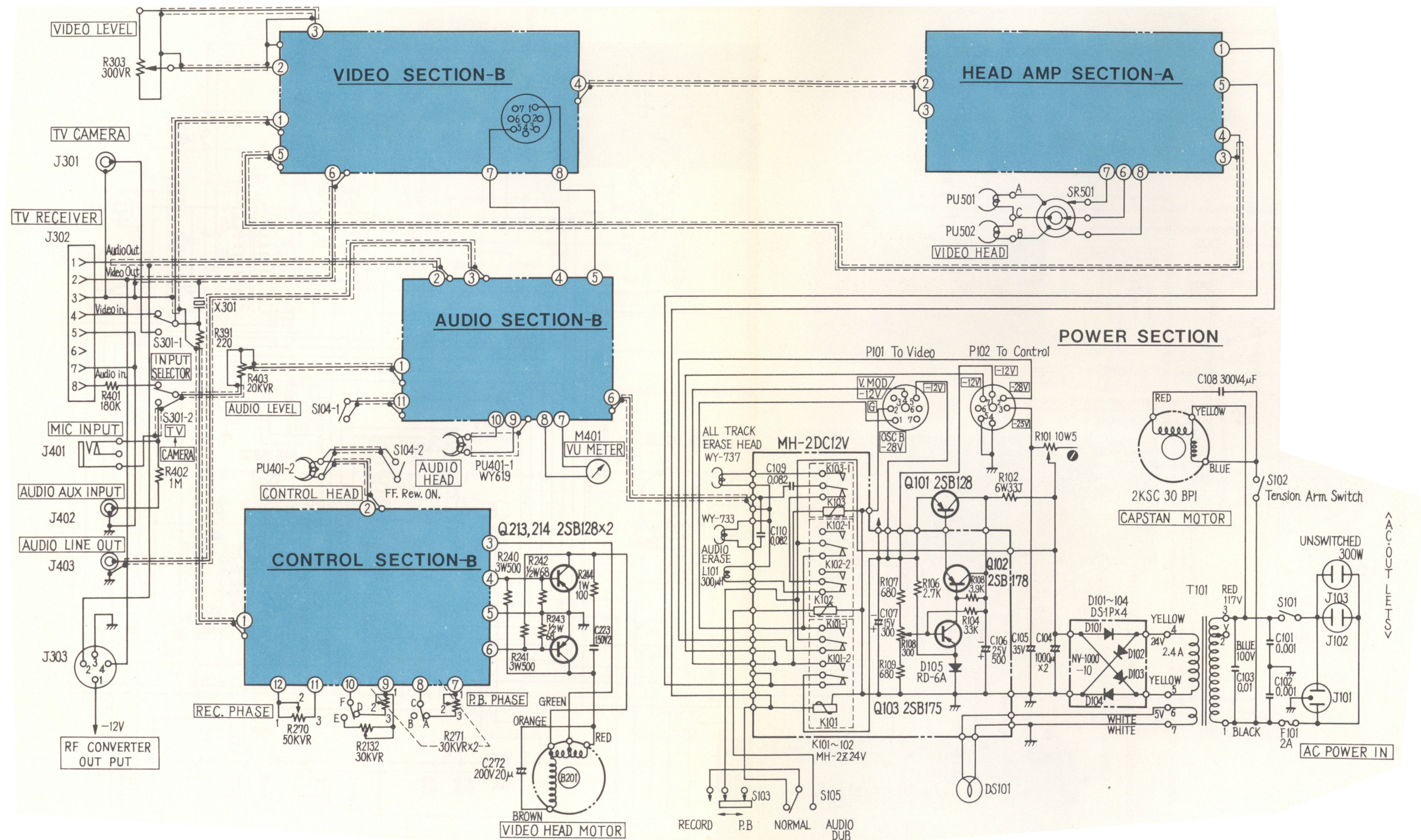
SCHEMATIC AND PCB DIAGRAMS

In this section of the service manual the schematic diagrams with the PCB diagrams are referred to as an aid of trouble shooting.

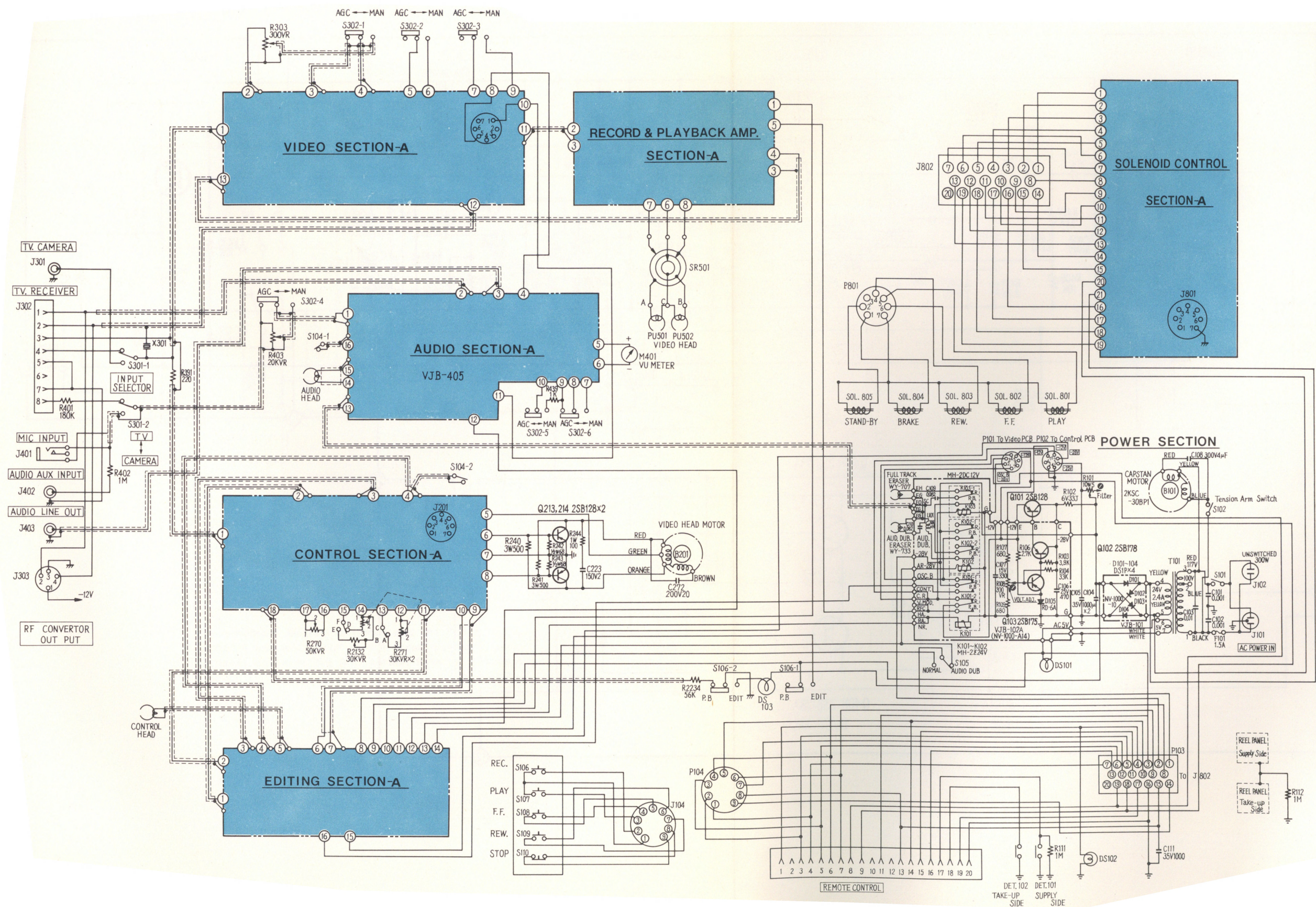
The models NV-8100, and NV-8100AD are traced into these diagrams. The model NV-8100A is to be referred to as the model NV8100AD without Electronic Editing section.

The connection diagrams are described in Black Box System in which each section of PCB is separately depicted for convenience.

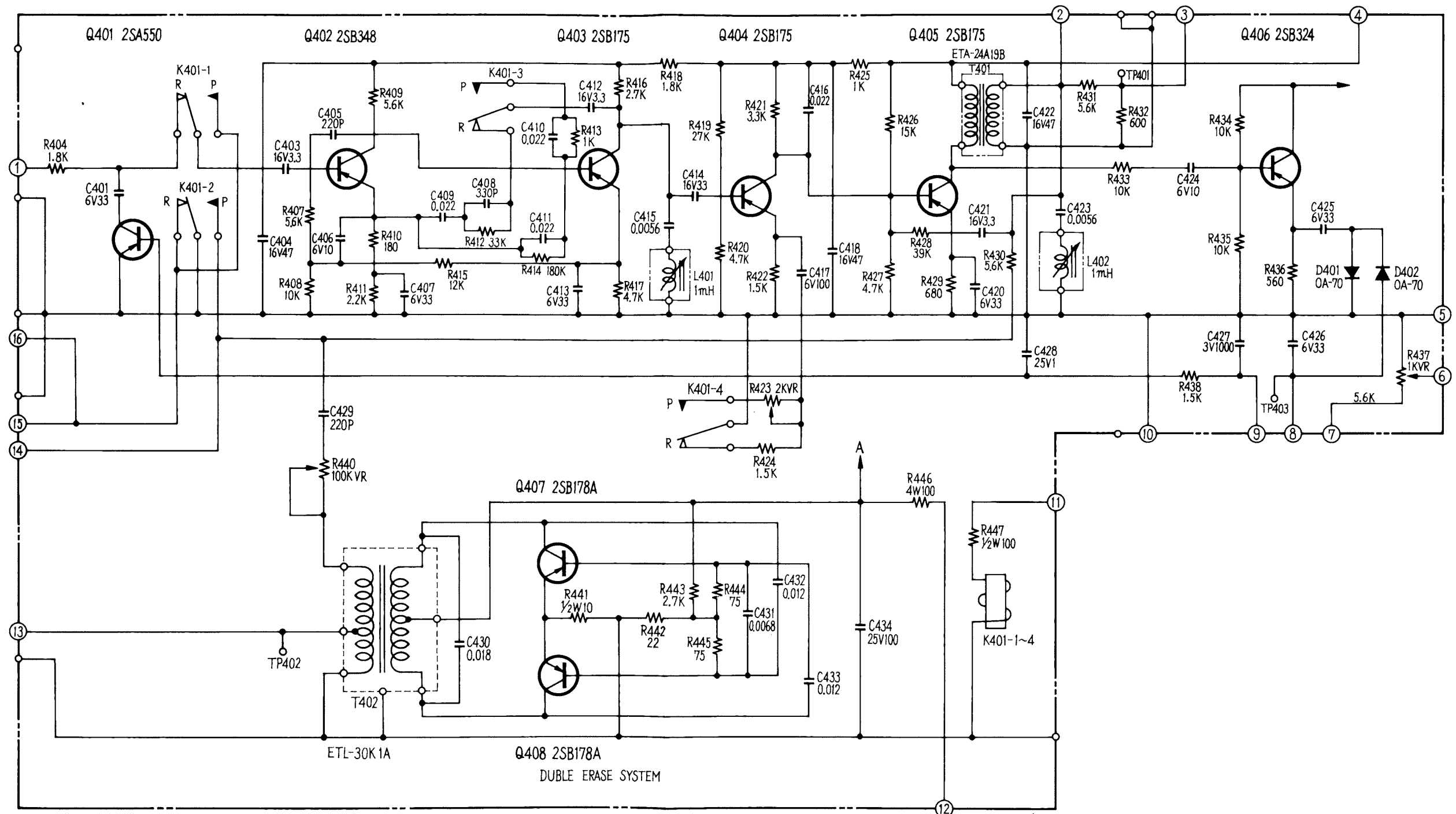
NV-8100 CONNECTION DIAGRAM



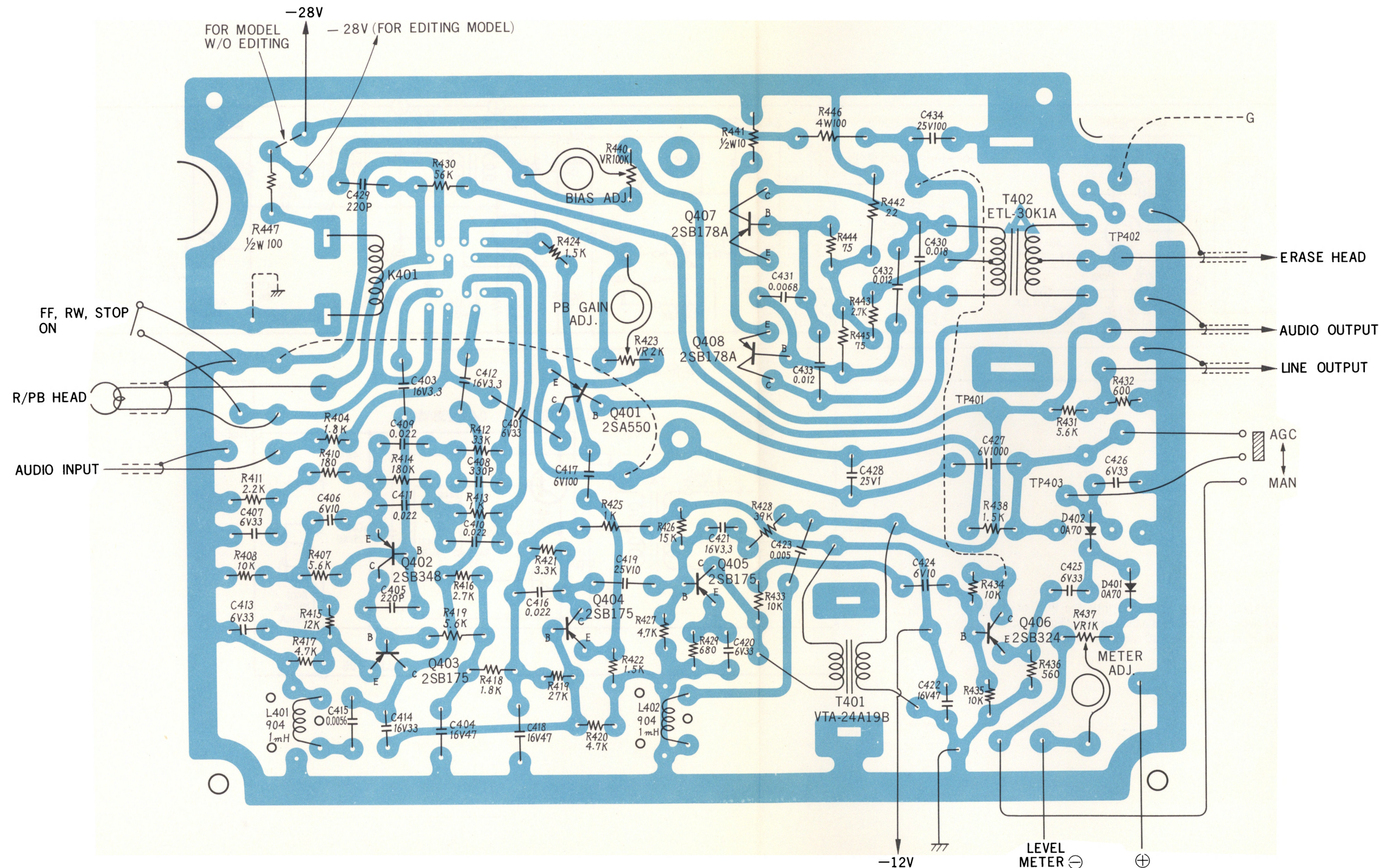
NV-8100AD CONNECTION DIAGRAM



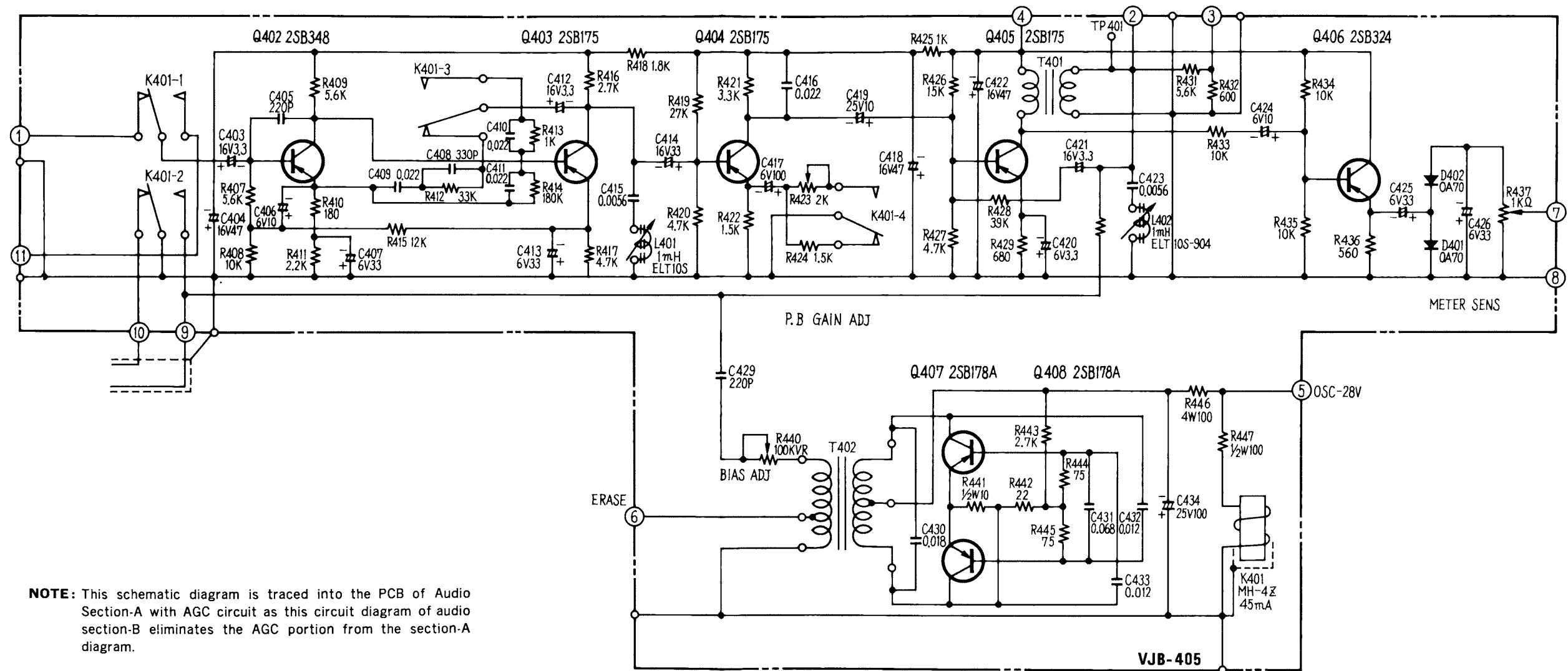
AUDIO SECTION-A (W/AGC)



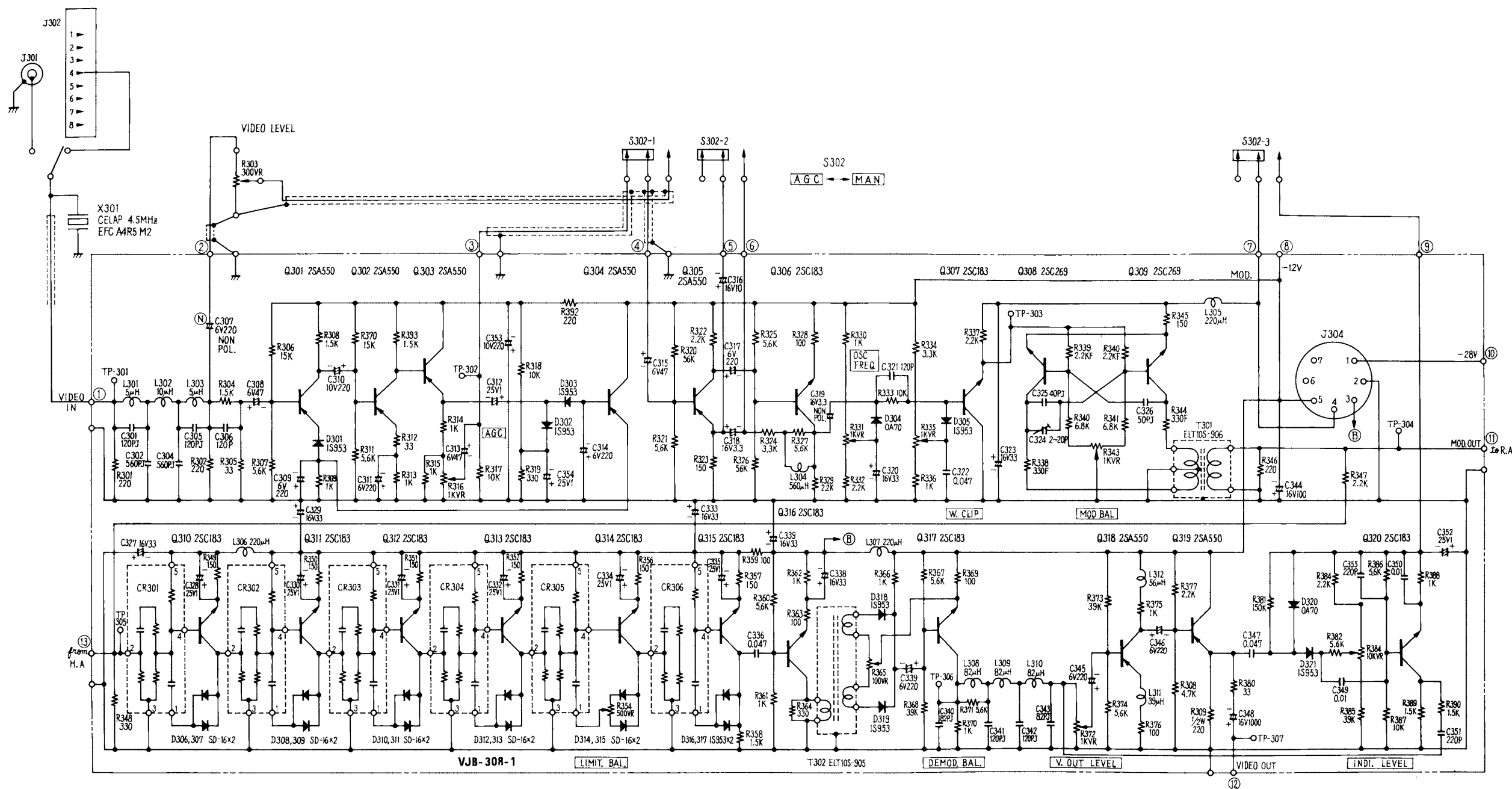
AUDIO SECTION-A



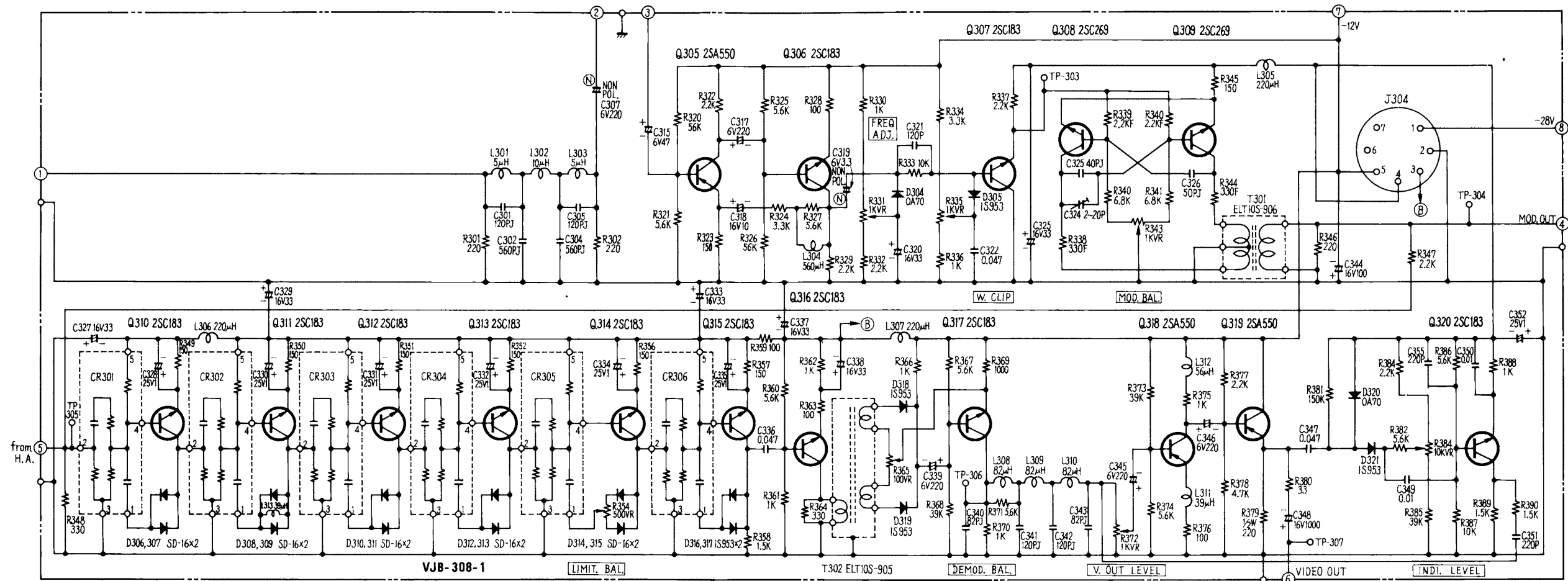
AUDIO SECTION-B(W/O AGC)



VIDEO SECTION-A (W/AGC)

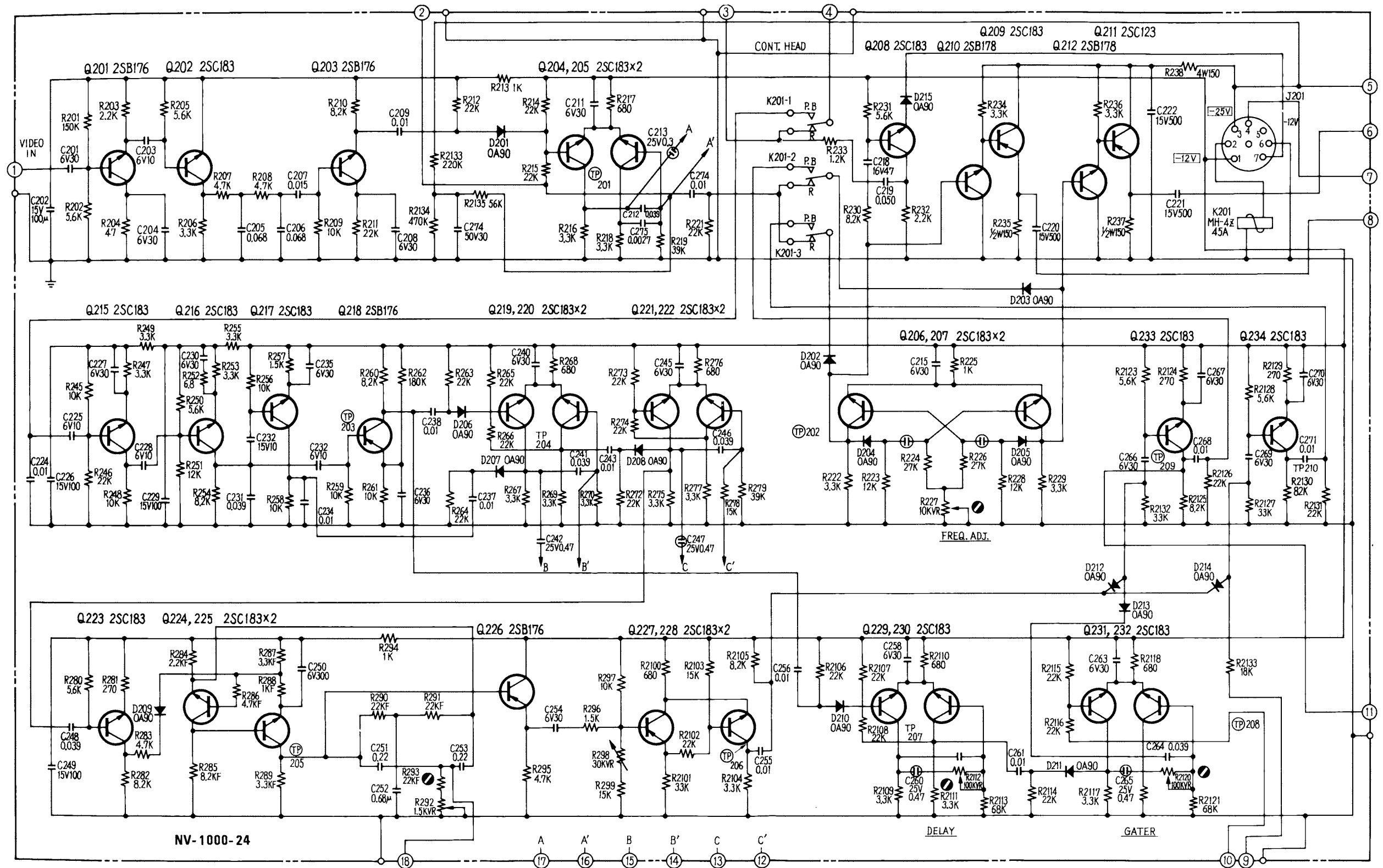


VIDEO SECTION-B (W/O AGC)

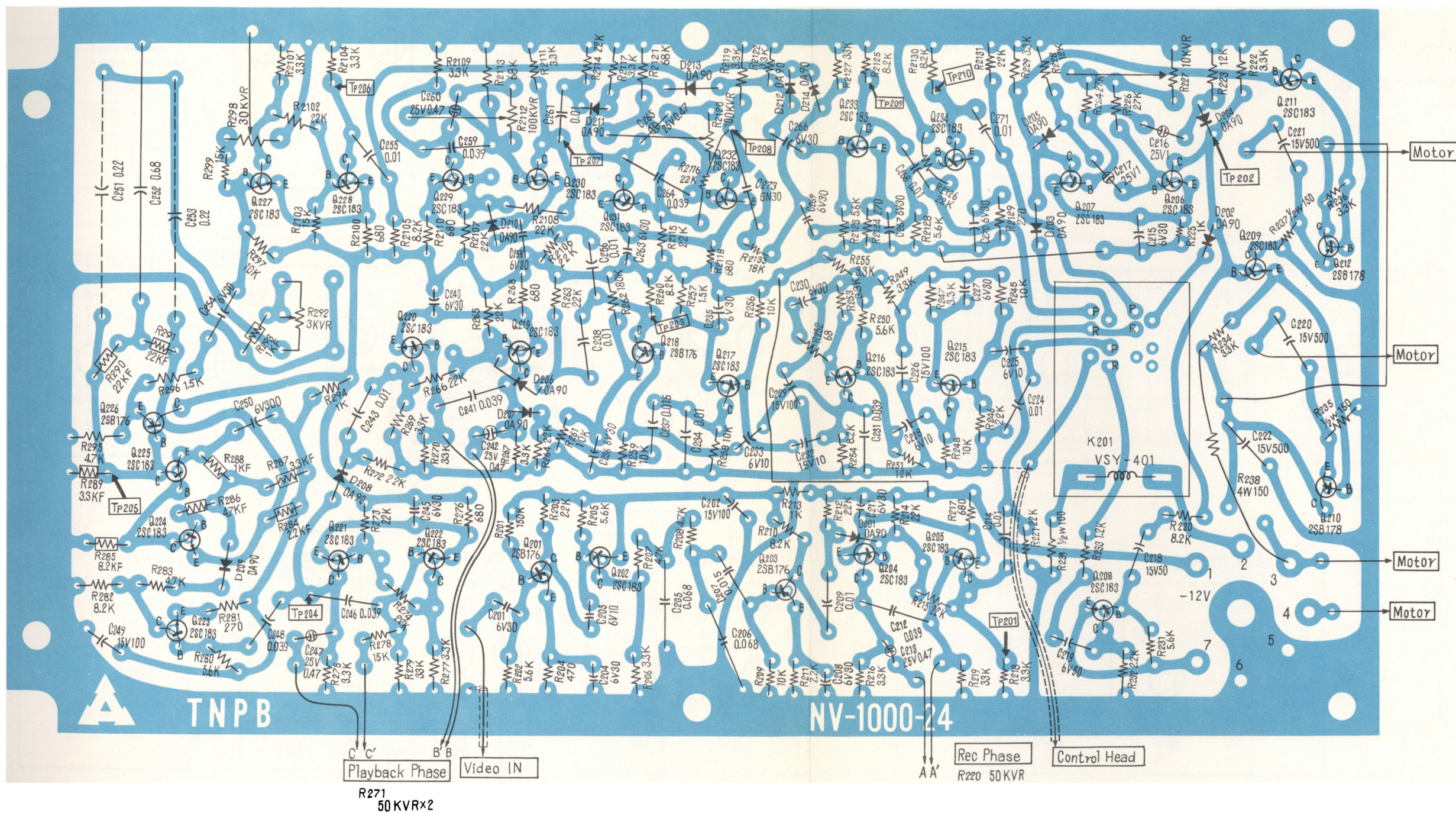


NOTE: The diagram above is traced into the PCB of video section-A with AGC circuit as this diagram of video section-B eliminates the AGC portion from the video section-A diagram.

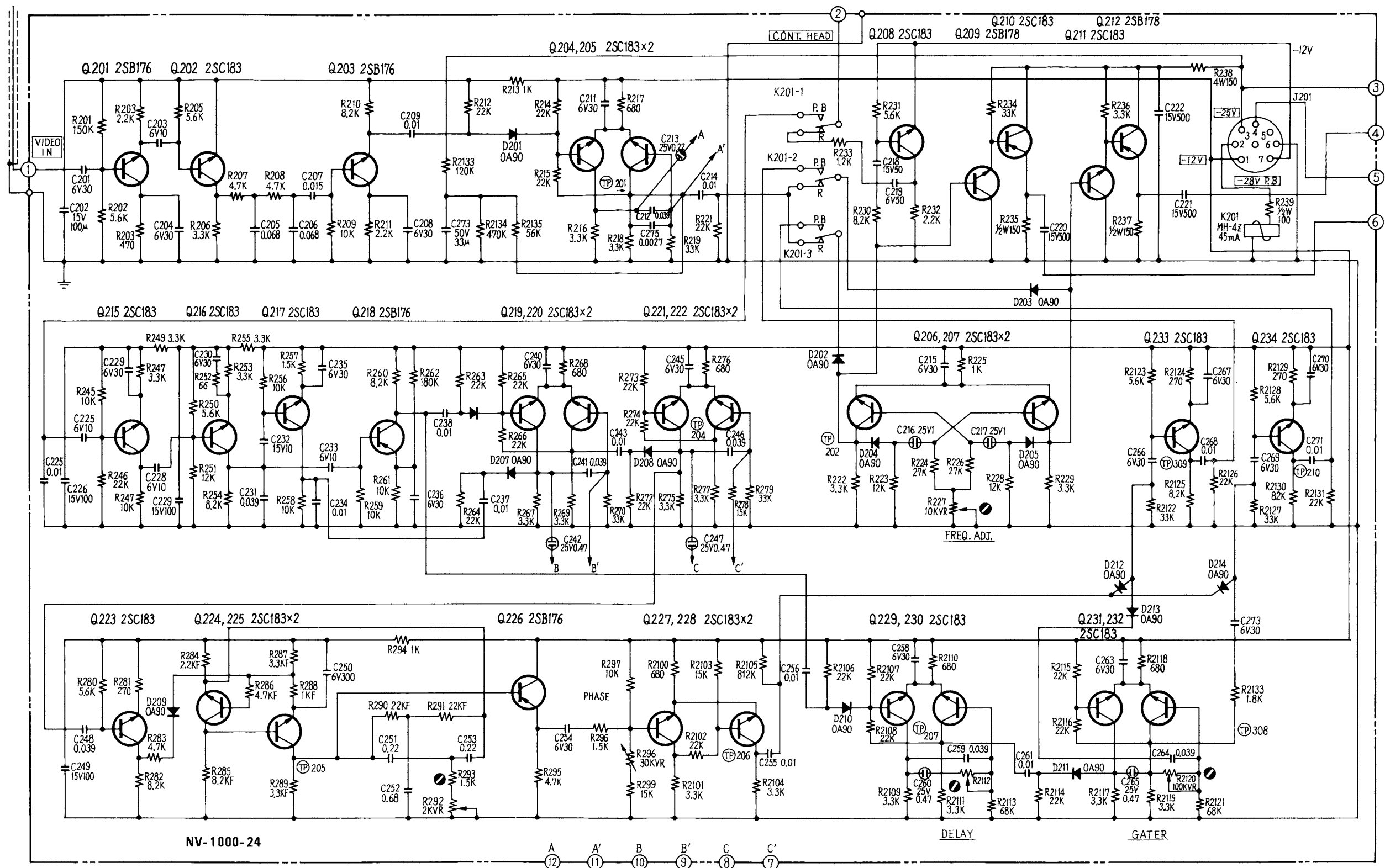
CONTROL SECTION-A



CONTROL SECTION-A

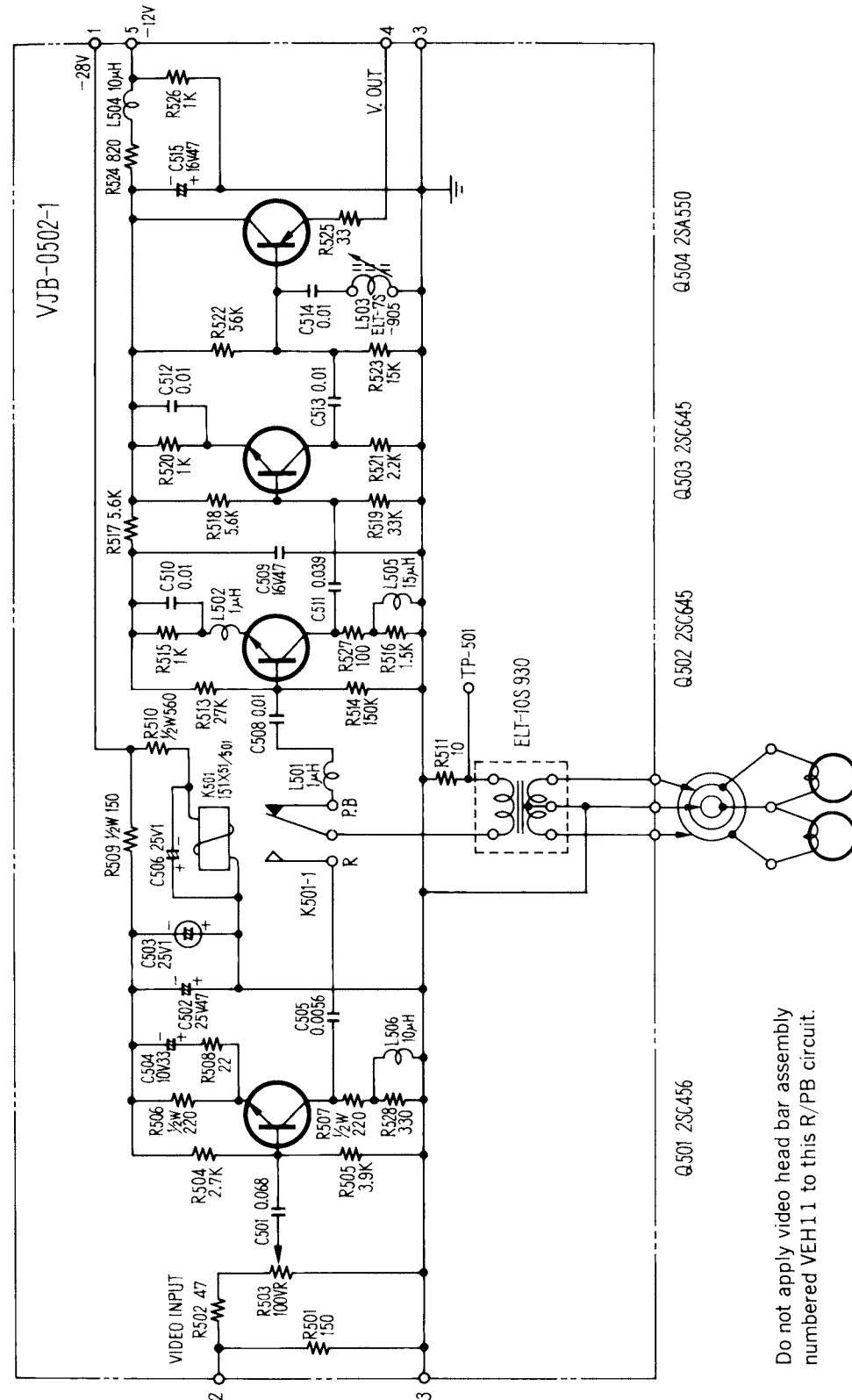


CONTROL SECTION-B

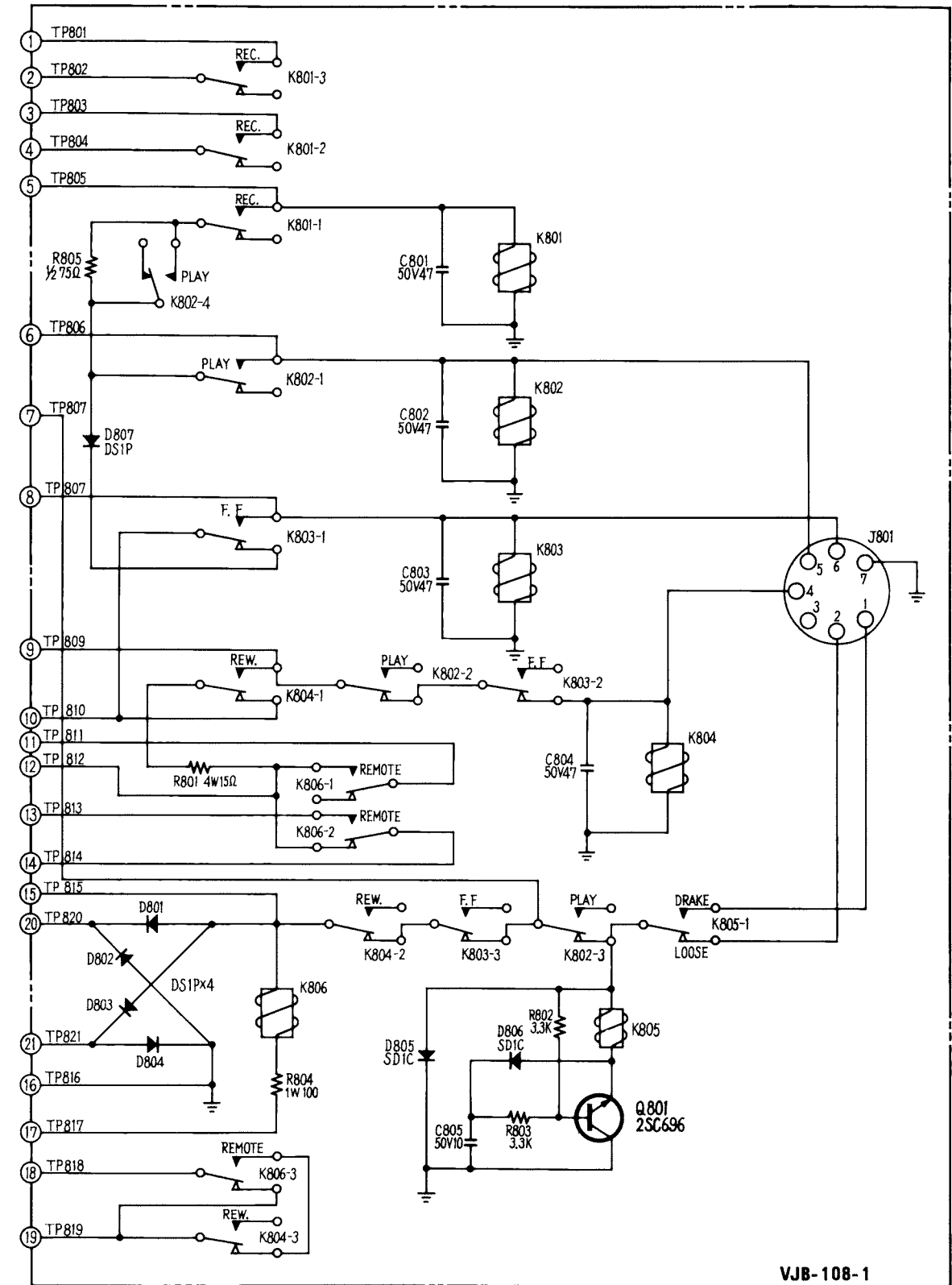


NOTE: This circuit of the control section-B is as same as that of section-A circuit except for the terminal locations. Please refer to the PCB diagram of the control section-A PCB for tracing troubles.

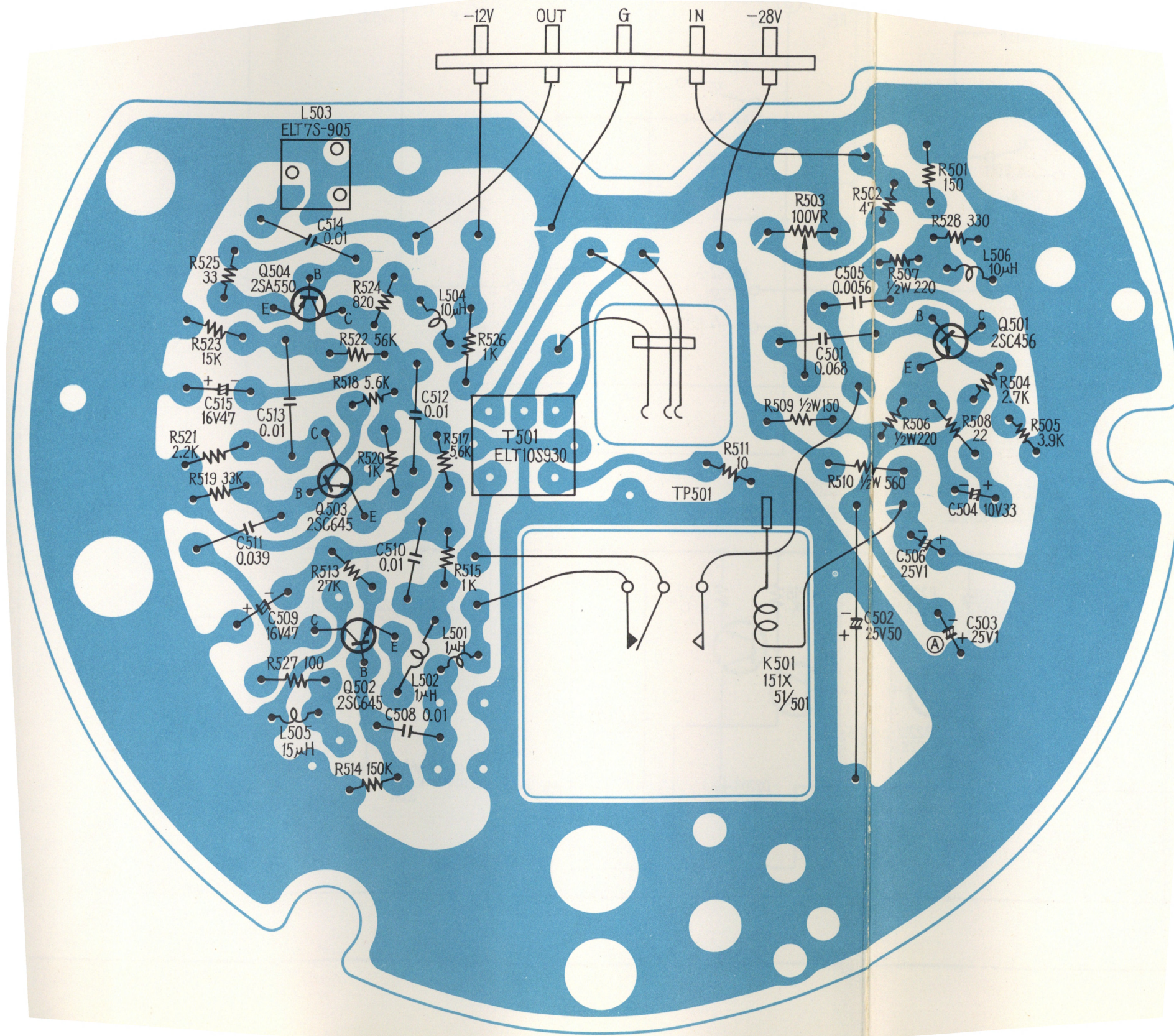
RECORD & PLAYBACK AMPLIFIER-A



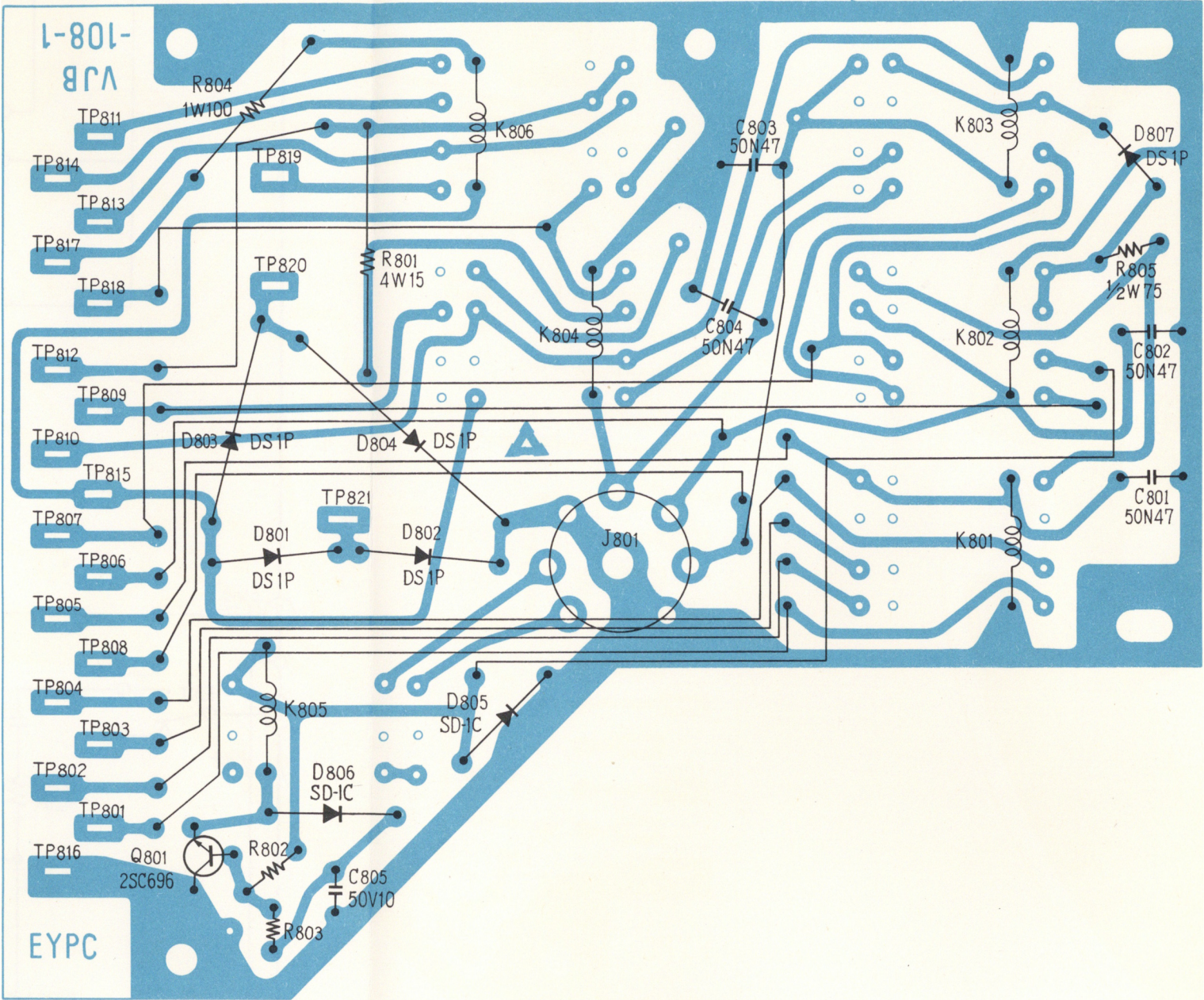
SOLENOID CONTROL SECTION-A



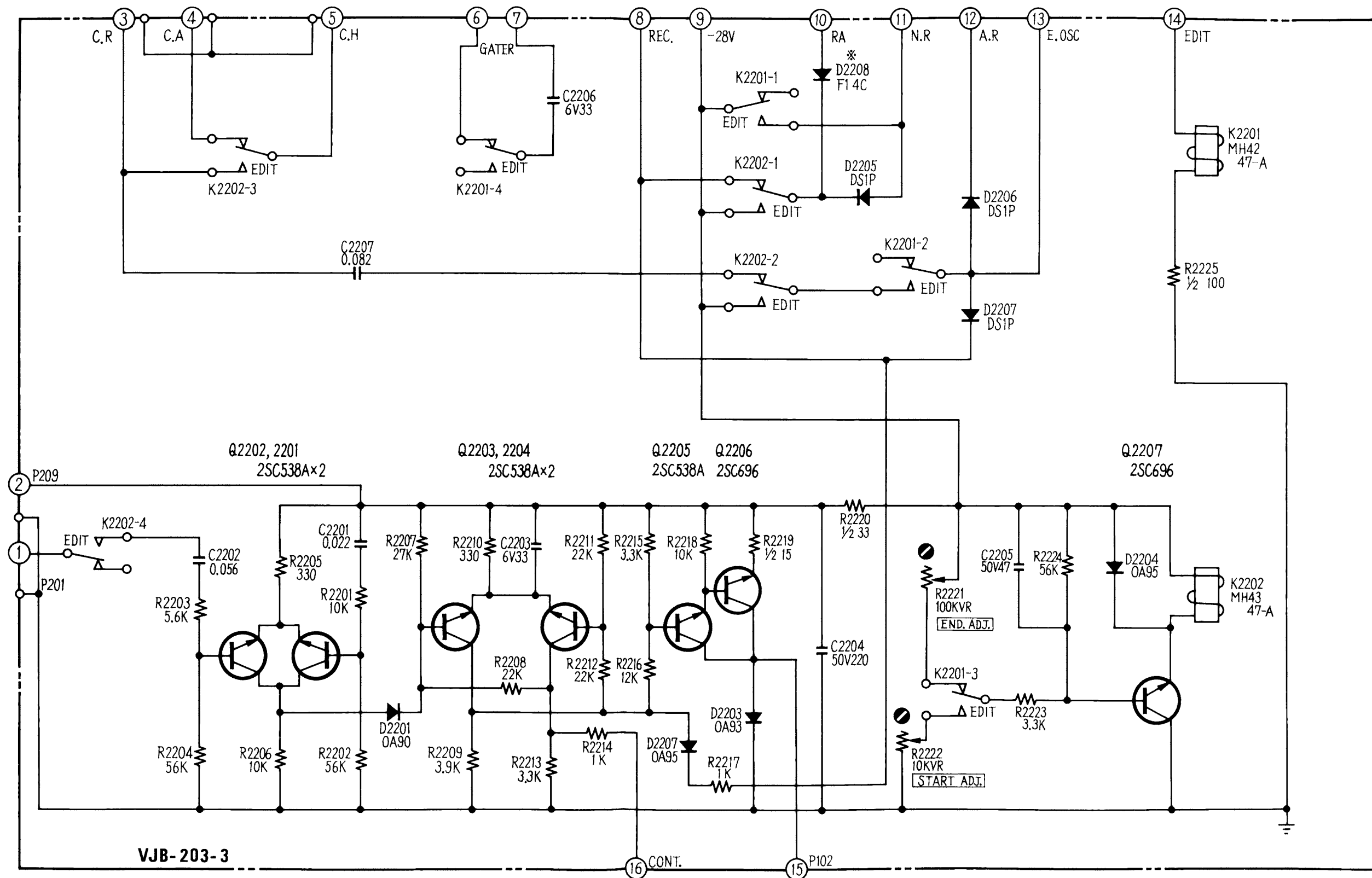
RECORD & PLAYBACK AMPLIFIER-A



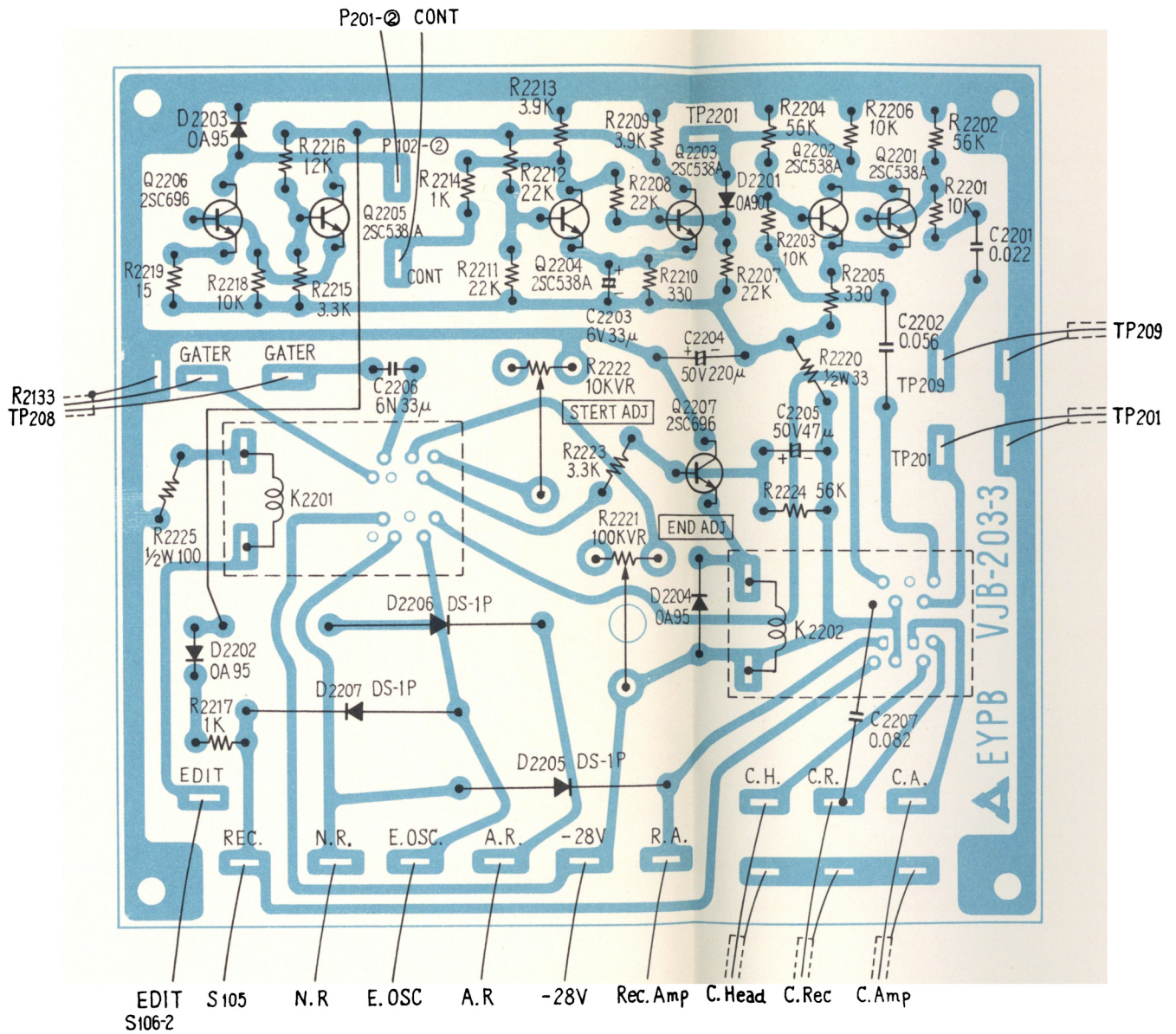
SOLENOID CONTROL SECTION-A



EDITING CIRCUIT-A



EDITING CIRCUIT-A



1

2